Utah Division of Air Quality
2020 Annual Report

UTAH DEPARTMENT *of*
ENVIRONMENTAL QUALITY

AIR
QUALITY

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Acronyms

AO	Approval Order
AHERA	Asbestos Hazard Emergency Response Act
ATLAS	Air Toxics, Lead-Based Paint, and Asbestos Section
AMS	Air Monitoring Section
BACT	Best Available Control Technology
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DAQ	Division of Air Quality
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
EVSE	Electric Vehicle Supply Equipment
HAPs	Hazardous Air Pollutants
MACT	Maximum Available Control Technology
$\mu g/m^3$	Micrograms Per Cubic Meter
Micron	One Millionth of a Meter
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O_3	Ozone
PB	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter Smaller Than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Smaller Than 2.5 Microns in Diameter
PPB	Parts Per Billion
PPM	Parts Per Million
SBEAP	Small Business Environmental Assistance Program
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
TSCA	Toxic Substances Control Act
TSP	Total Suspended Particles
UAC	Utah Administrative Code
VOCs	Volatile Organic Compounds

NOTE

THIS REPORT IS INTENDED TO PROVIDE AN OVERVIEW OF UTAH'S AIR QUALITY PROGRAM. THIS REPORT IS PUBLISHED BEFORE END-OF-YEAR DATA CAN BE CERTIFIED AND MAY BE SUBJECT TO CHANGE.

Introduction

The mission of the Utah Division of Air Quality (DAQ) is to safeguard Utah's air through balanced regulation. The purpose of DAQ is to achieve and maintain levels of air quality which will protect human health and safety, and to the greatest degree practicable, prevent injury to plant and animal life and property, foster the comfort and convenience of the people, promote the economic and social development of this state, and facilitate the enjoyment of the natural attractions of this state. It is the responsibility of the DAQ to ensure that the air in Utah meets health and visibility standards established under the federal Clean Air Act (CAA). To fulfill this responsibility, the DAQ is required by the federal government to ensure compliance with the U.S. Environmental Protection Agency's (EPA) National Ambient Air Quality Standards (NAAQS) statewide and visibility standards at national parks. The DAQ enacts rules pertaining to air quality standards, develops plans to meet the federal standards when necessary, administers emissions reductions incentive programs, issues preconstruction and operating permits to stationary sources, and ensures compliance with state and federal air quality rules.

The DAQ allocates a large portion of its resources to implementing the CAA. The Utah Air Conservation Act (Utah Code §19-2) delegates rulemaking power to the Utah Air Quality Board (Board) to promulgate rules pertaining to air quality issues. DAQ staff supports the Board in its policy-making role. The Board is made up of nine members representing local government, environmental groups, the public, industry, and the Executive Director of the Department of Environmental Quality. The Board members have diverse interests, are knowledgeable in air pollution matters, and are appointed by the Governor with consent of the Senate. The Director of the DAQ is the Board's Executive Secretary.

The Utah air quality rules define the Utah air quality program. Implementation of the rules requires the DAQ's interaction with industry, other government agencies, and the public. The state air quality program is responsible for the implementation of the federal standards under the CAA, as well as state rules for pollution sources not regulated by the CAA.

2020 Synopsis

The DAQ accomplished much in 2020 towards fulfilling our mission to safeguard and improve Utah's air. With an increasing population, industrial base, and more stringent federal air quality standards, it has been a challenge to meet air quality objectives; however, 2020 proved to be a year in which we made great strides to ensure cleaner air in the years to come.

The following is a brief list of notable air quality achievements from 2020:

Particulate Matter

- In January 2020, Governor Herbert submitted long-term Maintenance Plans to EPA that demonstrate how the three $PM_{2.5}$ nonattainment areas will maintain compliance with the 2006 24-hr $PM_{2.5}$ standard through the year 2035. EPA reviewed the plans and proposed redesignation of the Salt Lake and Provo areas to attainment. More information on this accomplishment can be found on page 39 of this report.

- EPA redesignated all three of Utah's PM_{10} nonattainment areas to attainment status for the federal 24-hour PM_{10} standard. The areas are now in the first of two 10-year maintenance periods. More information on this accomplishment can be found on page 38 of this report.

Ozone

- In 2018, three areas in Utah were designated nonattainment for the more stringent 2015 ozone standard. The three areas are currently classified as marginal status. Baseline inventories were submitted to EPA in 2020 and EPA is currently reviewing them for approval. The ambient monitoring data shows that the Southern Wasatch Front has attained the standard. The Northern Wasatch Front and the Uinta Basin will not be able to attain the standard by the statutory attainment date and will be reclassified to moderate. DAQ has begun work in anticipation of the CAA requirements associated with reclassification to moderate, which include a State Implementation Plan (SIP) for each area.

- Meeting the SIP requirements will require a significant amount of work for DAQ, including all new photochemical modeling for the Uinta Basin and the Wasatch Front. Section 179b of the CAA gives states the opportunity to demonstrate that international emissions are causing the violations of the standard. In response to a request from the Utah Petroleum Association, DAQ has spent a significant amount of time in 2020 on a 179b demonstration that would prevent the Northern Wasatch Front from being reclassified to moderate. The preliminary data shows that the Wasatch Front is not, in fact, significantly impacted by international emissions on high ozone summer days. If the final data analysis confirms the preliminary conclusion, then DAQ plans to focus 2021 efforts on producing a scientifically-sound model to support the CAA-required SIP demonstration, as opposed to spending more time on the discretionary 179b demonstration.

- DAQ scientists partnered with EPA to apply recent scientific findings about air emissions in the Uinta Basin to the Uinta Basin Emissions Inventory. This technical analysis is described in two white papers authored by UDAQ and EPA. This information will be used to update emission inventories in order to improve photochemical modeling for ozone regulatory purposes. More information on this accomplishment can be found at the links below:
  - Uinta Basin VOC Composition Study Impacts on the 2017 Oil and Gas Emissions Inventory

- Produced Water Disposal Facility Emission Factors & their Impact on the 2017 Oil and Gas Emissions Inventory

Regional Haze

- In November 2020, EPA finalized approval of Utah's Regional Haze SIP for the first planning period. The second planning period SIP amendment is due July 2021. More information on this accomplishment and topic can be found on page 43 of this report.

Air Quality Research Projects

- FY2021 funding included ongoing legislative funding of $500,000 for DAQ to select air quality research projects through a competitive process. This annual research funding helps DAQ improve its knowledge of the unique atmospheric and chemical conditions that contribute to air pollution in Utah. Information regarding the projects funded for FY21 can be found on Page 34 of this report.

Compliance

- DAQ inspectors conducted over 1,200 compliance inspections throughout the State. This includes full compliance evaluations at all 76 major sources and 556 minor sources. Additionally, there were 338 stack test/CEM (continuous emissions monitors) audits and reviews, 508 asbestos/lead-based paint phone calls, and 260 miscellaneous inspections (surveillance, compliance, partial inspections). The DAQ collected $201,051 in penalties in 2020.
- DAQ now employs two full time compliance inspectors stationed in the Uinta Basin as a concerted effort to focus on rural Utah.
- More information on Compliance can be found on Page 56 of this report.

Permitting

- DAQ issued 97 permits during the 2020 Fiscal Year, with an average of 158 days to issue the permit from the submission of an application, down from 220 days in Fiscal Year 2019.
- There are currently 77 Title V sources in Utah.
- More information on Permitting can be found on Page 60 of this report.

Air Quality Standards

The CAA requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. The CAA establishes two types of air quality standards: primary and secondary. Primary standards are set to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are set to protect public welfare, including protection from decreased visibility and damage to animals, crops, vegetation, and buildings.

Standards are composed of a numerical value and a form (see Table 2). The form may be a statistical value, such as the 98th percentile calculation or a rolling average over a designated period of time that is then compared against the numerical value.

The EPA has established health-based NAAQS for six pollutants known as criteria pollutants. The six criteria pollutants are carbon monoxide, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, and lead. Each of these pollutants is addressed in greater detail later in this chapter. Table 1 provides a brief description of each criteria pollutant and Table 2 provides a brief description of each criteria pollutant's primary and secondary standard. The EPA establishes the primary health standards after considering both the concentration level and the duration of exposure that can cause adverse health effects. Pollutant concentrations that exceed the NAAQS are considered unhealthy for some portion of the population. At concentrations between 1.0 and 1.5 times the standard, while the general public is not expected to be adversely affected by the pollutant, the most sensitive portion of the population may be. However, at levels above 1.5 times the standard, even healthy people may see adverse effects.

The DAQ monitors each of these criteria pollutants, as well as meteorological conditions and several non-criteria pollutants for special studies at various monitoring sites throughout the state.

Table 1. EPA Designated Criteria Pollutants

Name	*Sources*	*Health Effects*	*Welfare Effects*
Carbon Monoxide (CO), a clear, colorless, odorless gas.	Burning of gasoline, wood, natural gas, coal, oil, etc.	Reduces the ability of blood to transport oxygen to body cells and tissues. May be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages.	
Nitrogen Dioxide (NO_2) (one component of NO_x) smog-forming chemical.	Burning of gasoline, natural gas, coal, oil, and other fuels; Cars are also an important source of NO2	Can cause lung damage, illnesses of breathing passages and lungs (respiratory system).	Ingredient of acid rain (acidaerosols) which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility.
Ozone (O_3) (ground-level ozone is the principal component of smog)	Chemical reaction of pollutants; Volatile Organic Compounds (VOCs) and NO_x	Can cause breathing problems, reduced lung function, asthma, irritated eyes, stuffy nose, and reduced resistance to colds and other infections. It may also speed up aging of lung tissue.	Can damage plans and trees; smog can cause reduced visibility.
Particulate Matter (PM_{10}, $PM_{2.5}$) dust, smoke, soot.	Burning of gasoline, natural gas, coal, oil, and other fuels; industrial plans; agriculture (plowing or burning fields); unpaved roads, mining, construction activities. Particles are also formed from the reaction of VOCs, NO_x, SO_x, and other pollutants in the air.	Can cause nose and throat irritation, lung damage, bronchitis, and early death.	Main source of haze that reduces visibility.
Sulfur Dioxide (SO_2)	Burning of coal and oil (including diesel and gasoline); industrial processes.	Can cause breathing problems and may cause permanent damage to lungs.	Ingredient of acid rain (acidaerosols) which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility.
Lead (Pb)	Paint (houses, cars), smelters (metal refineries); manufacture of lead storage batteries; note: burning leaded gasoline was the primary source of lead pollution in the U.S. until the federal government mandated unleaded gasoline.	Damages the nervous systems, including the brain, and causes digestive system damage. Children are at special risk. Some lead-containing chemicals cause cancer in animals.	Can harm wildlife.

Table 2. Ambient Air Quality Standards for Criteria Air Pollutants

Pollutant	Averaging Time	Primary / Secondary	Standard	Form
Ozone (O_3)	8 Hour	Primary and Secondary	0.070 ppm	Annual Fourth-highest daily maximum 8-hr concentration, averaged over three years
Respirable Particulate Matter (PM_{10})	24 Hour	Primary and Secondary	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over three years
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	Primary and Secondary	35 $\mu g/m^3$	98th percentile, averaged over three years
	Annual	Primary	12 $\mu g/m^3$	Annual mean, averaged over three years
		Secondary	15 $\mu g/m^3$	Annual mean, averaged over three years
Carbon Monoxide (CO)	1 Hour	Primary	35 ppm	Not to be exceeded more than once per year
	8 Hour	Primary	9 ppm	Not to be exceeded more than once per year
Nitrogen Dioxide (NO_2)	1 Hour	Primary and Secondary	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over three years
	Annual	Primary and Secondary	53 ppm	Annual mean
Sulfur Dioxide (SO_2)	1 Hour	Primary	75 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over three years
	3 Hour	Secondary	0.5 ppm	Not to be exceeded more than once per year
Lead (Pb)	Rolling 3 month average	Primary and Secondary	0.15 $\mu g/m^3$	Not to be exceeded

Ambient Air Quality in Utah

Utah's Air Monitoring Network

The Air Monitoring Section (AMS) operates a network of monitoring stations throughout Utah. The monitors are situated to measure air quality in both neighborhoods and industrial areas. Table 3 shows the monitoring station locations and monitored constituents for stations operated in 2020.

Table 3. Utah Monitoring Network Stations

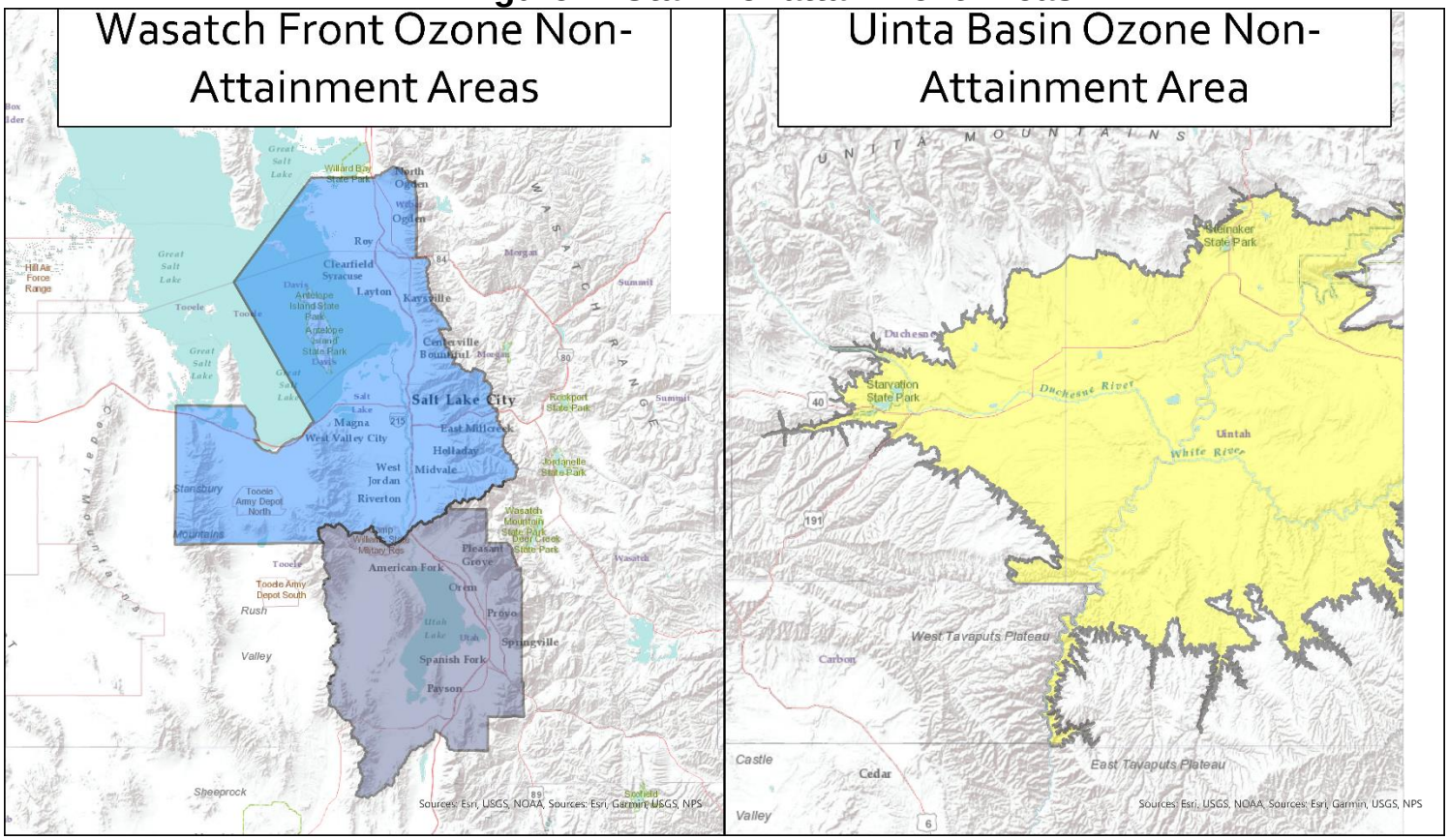
Station	City	Address	CO	NO_2	O_3	PM_{10}	$PM_{2.5}$	SO_2	Met.
Air Monitoring Center	SLC	240 N. 1950 W.	X	X	X	X	X	X	
Antelope Island	None	North end of island							X
Bountiful	Bountiful	200 W. 1380 N.		X	X		X		X
Copperview	Midvale	8449 S. Monroe St.	X	X	X		X	X	X
Enoch	Enoch	3840 N. 325 E. Minersville Hwy.		X	X		X		X
Erda	Tooele	2163 West Erda Way		X	X		X		X
Escalante	Escalante	755 West Main			X				
Harrisville	Harrisville	425 W. 2250 N.	X	X	X		X		X
Hawthorne	SLC	1675 S. 600 E.	X	X	X	X	X	X	X
Herriman	Riverton	14058 Mirabella Dr.		X	X	X	X		X
Hurricane	Hurricane	150 N. 870 W.		X	X		X		X
Lindon	Lindon	30 N. Main St.	X	X	X	X	X		X
Magna	Magna	9228 W. 2700 S.		X	X	X	X	X	X
Near Road	Murray	4951 S. Galleria Dr.	X	X	X		X		X
Price #2	Price	351 S. Weasel Run Rd.		X	X				X
Prison	SLC	On Prison Site	X	X	X		X		X
Roosevelt	Roosevelt	290 S. 1000 W.		X	X		X		X
Rose Park	SLC	1354 W. Goodwin Ave.	X	X	X		X	X	X
Saltair	None	6640 W. 1680 N.					X		X
Smithfield	Smithfield	675 W. 220 N.		X	X	X	X		X
Spanish Fork	Spanish Fork	312 W. 2050 N.			X		X		X
Vernal	Vernal	628 N. 1700 W.		X	X		X		X

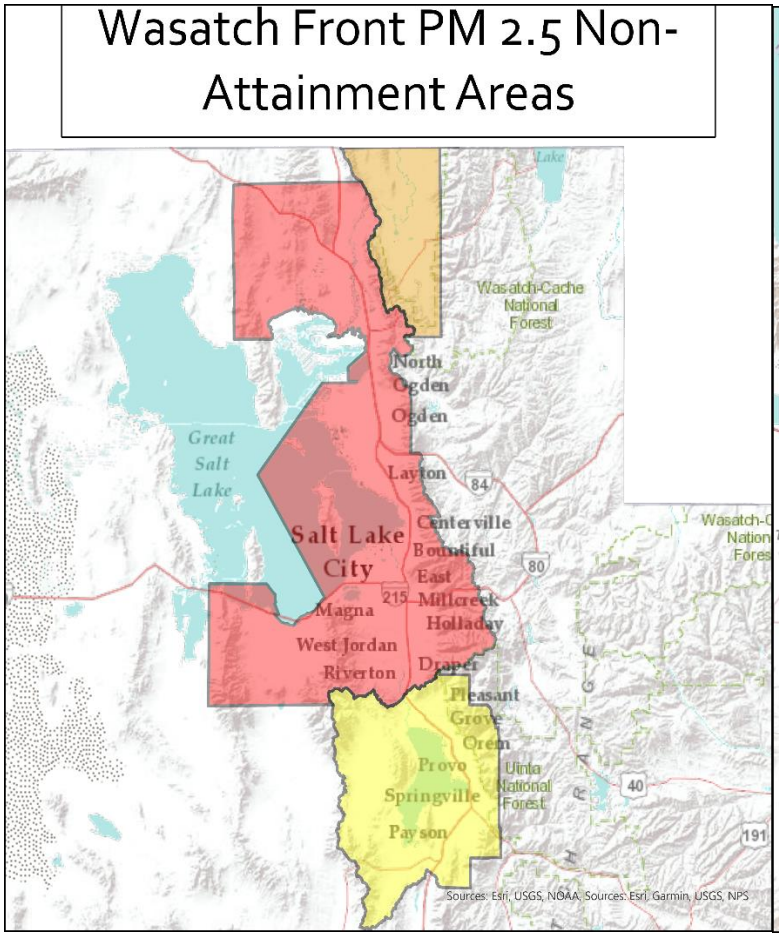
NAAQS Nonattainment & Maintenance Areas

The CAA has three different designations for areas based on whether or not they meet the NAAQS for each pollutant. Areas in compliance with the NAAQS are designated as attainment areas. Areas where there is no monitoring data showing that they are or are not in compliance with the NAAQS are designated as unclassifiable areas. Areas that are not in compliance with the NAAQS are designated as nonattainment areas. A maintenance area is an attainment area that was once designated as nonattainment for one of the NAAQS, and has since demonstrated to the EPA that it has and will continue to attain that standard for a period of a minimum of 10 years.

Most of the State of Utah has been designated as either Attainment or Unclassifiable for all of the NAAQS. Figure 1 contains maps of the current nonattainment areas within the state by pollutant, and Figure 2 shows the maintenance areas in Utah.

Figure 1. Utah Nonattainment Areas




Wasatch Front PM 2.5 Non-Attainment Areas
Great Salt Lake
Wasatch-Cache National Forest
North Ogden
Ogden
Layton
Salt Lake City
Centerville
Bountiful
East Millcreek
Holladay
Magna
West Jordan
Riverton
Draper
Pleasant Grove
Orem
Provo
Springville
Payson
Uinta National Forest
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

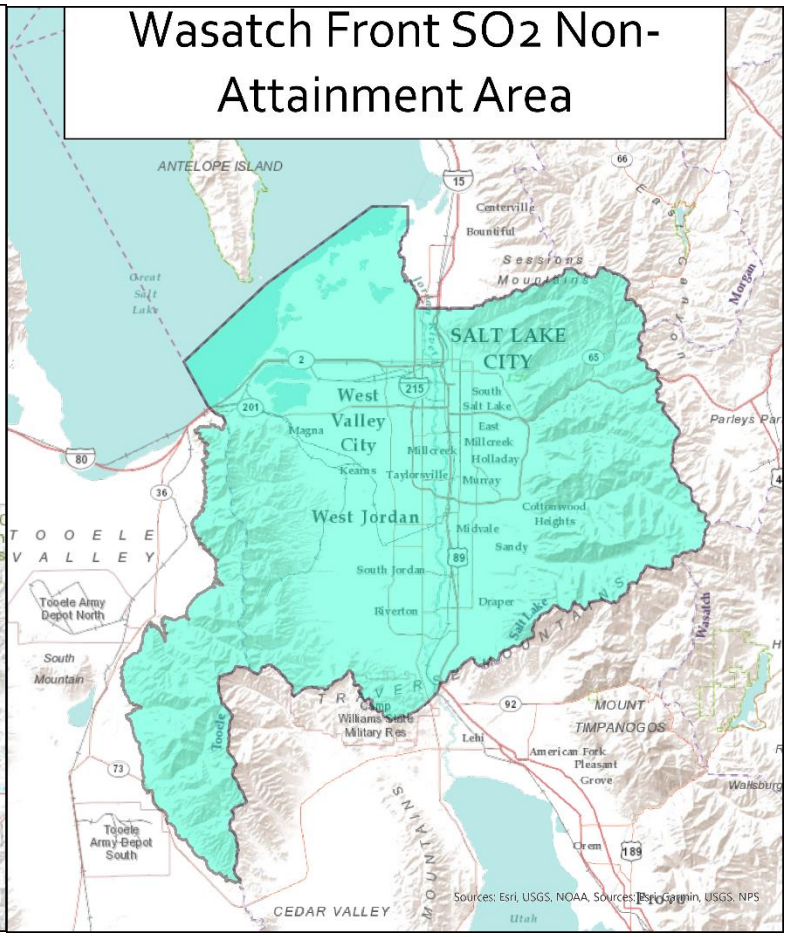
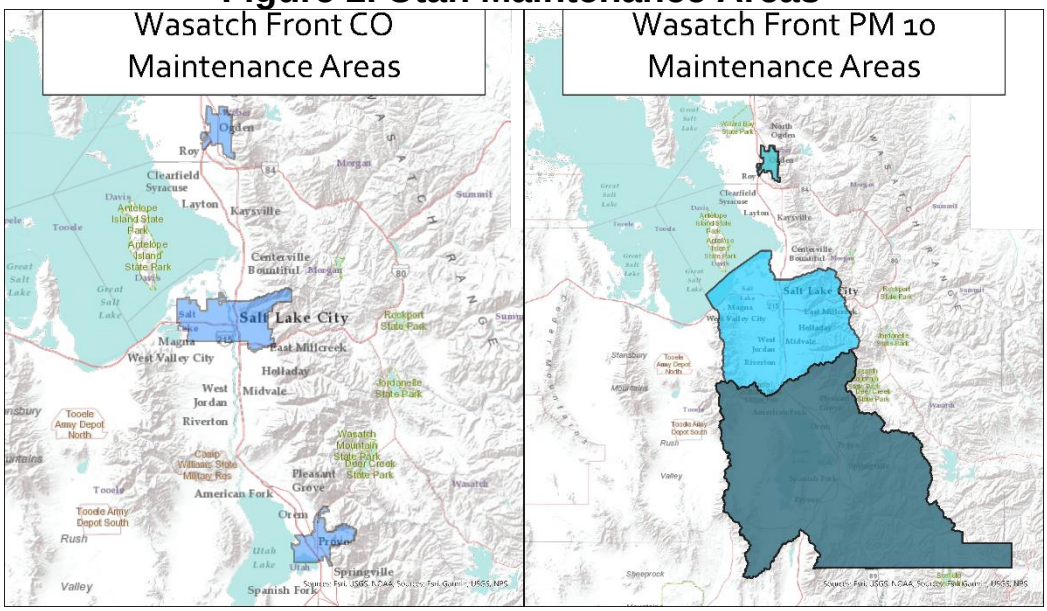

Wasatch Front SO2 Non-Attainment Area
ANTELOPE ISLAND
Great Salt Lake
Centerville
Bountiful
Sessions Mountains
SALT LAKE CITY
West Valley City
South Salt Lake
East Millcreek
Holladay
Magna
Millcreek
Kearns
Taylorsville
Murray
Cottonwood Heights
West Jordan
Midvale
Sandy
South Jordan
Riverton
Draper
TOOELE VALLEY
Tooele Army Depot North
South Mountain
Camp Williams Stable Military Res
Lehi
MOUNT TIMPANOGOS
American Fork
Pleasant Grove
Tooele Army Depot South
CEDAR VALLEY
Utah
Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

Figure 2. Utah Maintenance Areas



Criteria Air Pollutants

Carbon Monoxide (CO)

Carbon monoxide is a colorless and odorless gas formed by the incomplete combustion of carbon-based fuel. Carbon monoxide is primarily produced from on-road motor vehicles. Other significant sources of carbon monoxide emissions are wood burning stoves and fireplaces. The remaining emissions come from industrial facilities, construction equipment, miscellaneous mobile sources and other types of space heating.

Because motor vehicle emissions are the major source of carbon monoxide, the highest concentrations occur during morning and evening rush hours near high-traffic areas. The worst problems occur when there are large numbers of slow-moving vehicles in large parking lots, busy intersections, and traffic jams. Historically, as exhibited in the CAA, it was the EPA's presumption that all elevated carbon monoxide levels were the result of mobile source emissions, and a state had to go through a rigorous demonstration to prove otherwise. In Utah, areas of elevated carbon monoxide concentrations were always found near roadways. Carbon monoxide problems are greater in winter due to several factors: cold weather makes motor vehicles run less efficiently, wood burning, and other space heating take place, and temperature inversions trap carbon monoxide near the ground.

Standards

The EPA has developed two national standards for carbon monoxide. They are 35 ppm of CO averaged over a one-hour period, and 9 ppm of CO averaged over an eight-hour period. A violation of the NAAQS occurs with the second exceedance of either standard at a single location in a calendar year. Once a location is in violation, it is designated as a "nonattainment area."

Utah Monitoring Data

Three cities in Utah (Salt Lake City, Ogden, and Provo) were at one time designated as nonattainment areas for carbon monoxide. Due primarily to improvements in motor vehicle technology, Utah has complied with the carbon monoxide standards since 1994 (see Figure 3 and Figure 4). Salt Lake City, Ogden, and Provo were successfully re-designated to attainment status in 1999, 2001, and 2006, respectively.

Figure 3. Carbon Monoxide Second Highest 1-HourConcentration

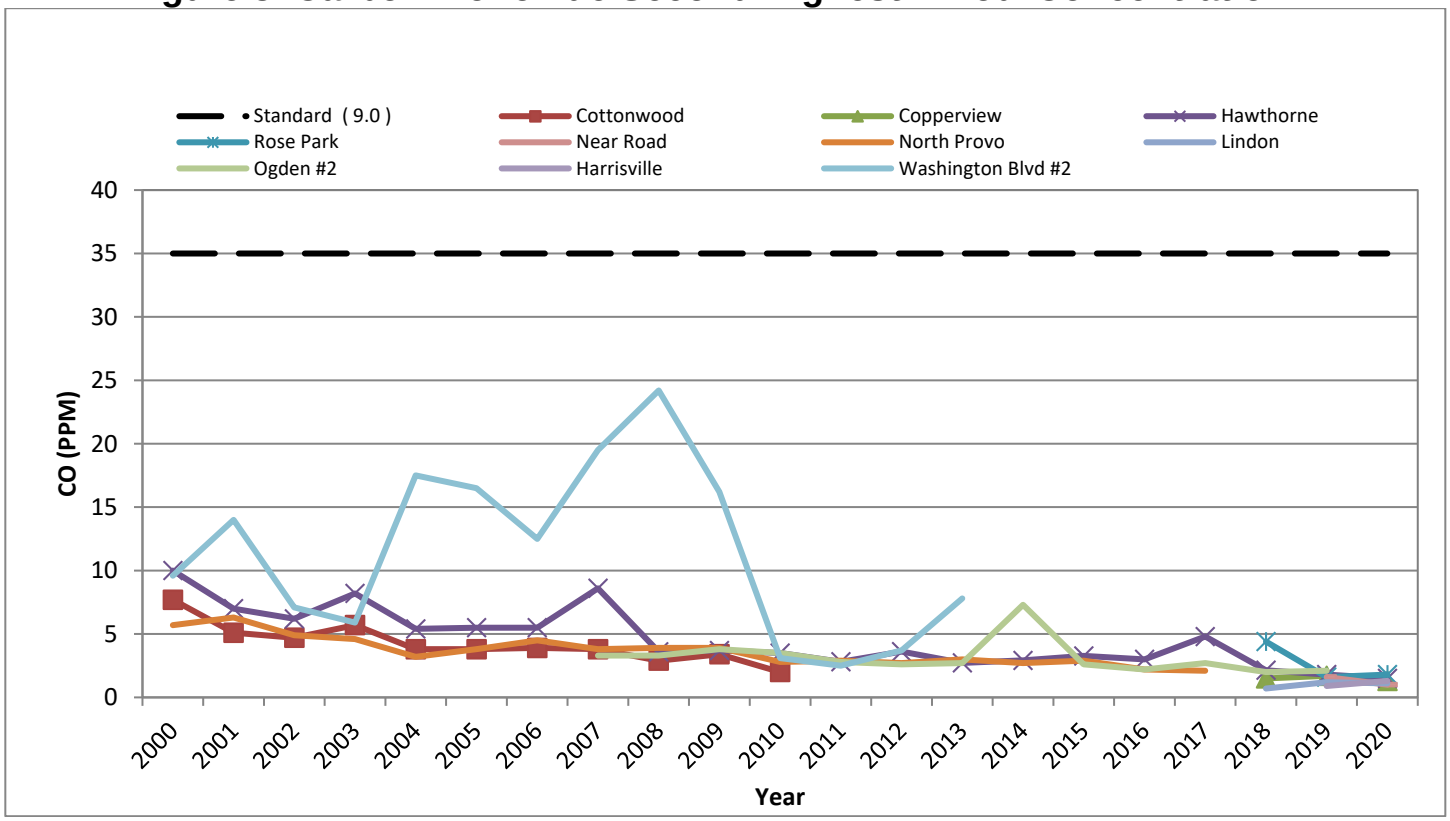
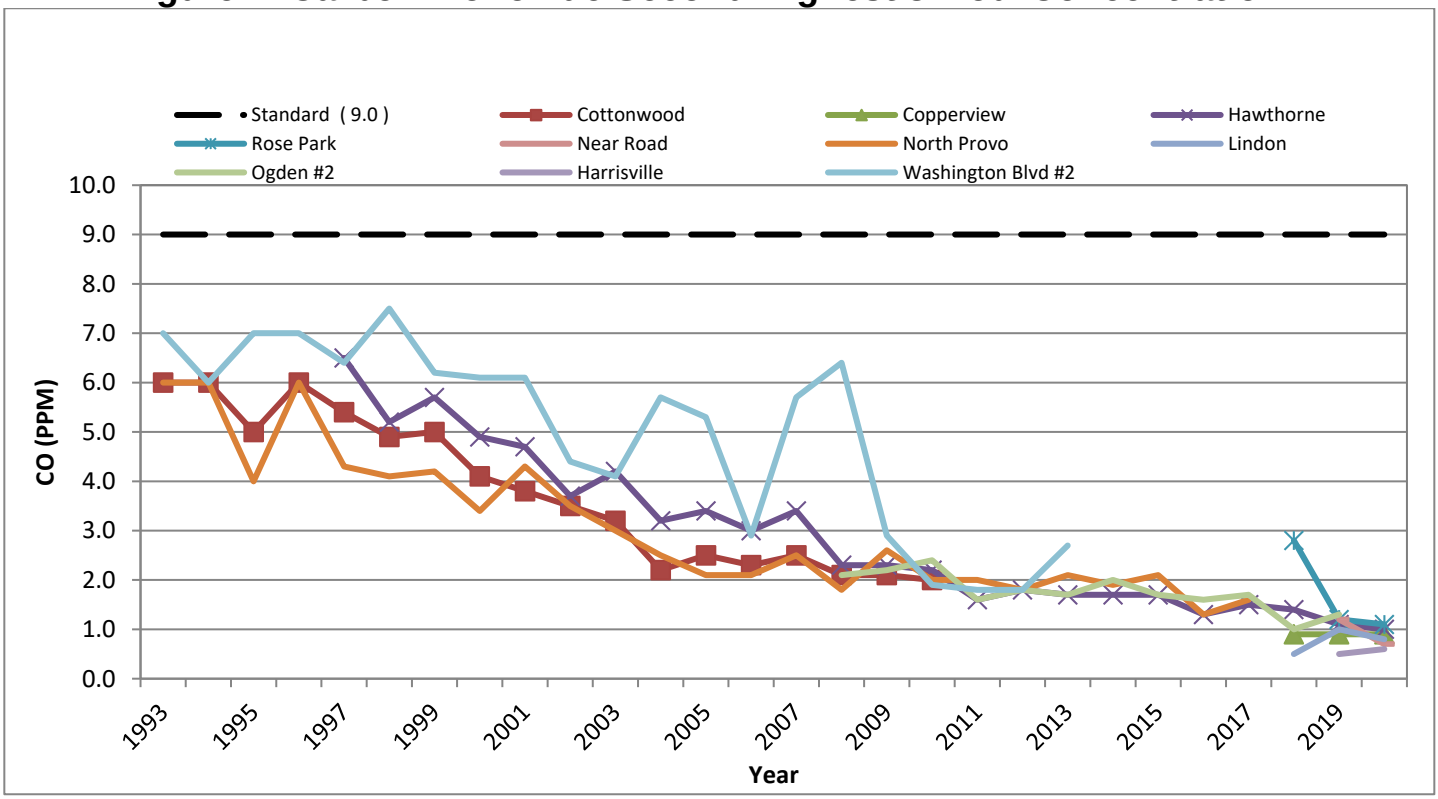


Figure 4. Carbon Monoxide Second Highest 8-HourConcentration



Nitrogen Dioxide (NO_2)

During high temperature combustion, nitrogen in the air reacts with oxygen to produce various oxides of nitrogen, or NO_x, a reddish-brown gas. One of the oxides of nitrogen, NO_2, is a criteria pollutant.

Oxides of nitrogen react with other air contaminants to form other criteria pollutants. In the summer along the Wasatch Front, and in the winter in the Uinta Basin, photochemical reactions between NO_2 and volatile organic compounds (VOCs) lead to the formation of ground-level ozone. In the winter, NO_2 reacts with ammonia to form fine particulate matter ($PM_{2.5}$). Both of these seasonal scenarios can result in increased pollution. Utah continues to struggle with both the ozone and particulate matter standards; and because of this, the DAQ is mindful of the trend in NO_2 concentrations illustrated in Figure 5.

Standards

The EPA has established two national standards for NO_2 – an hourly standard and an annual standard. The hourly standard is set at 100 ppb measured as the three-year average of the 98th percentile of the annual distribution of daily maximum one-hour average concentrations.

The annual NO_2 standard of 0.053 ppm is expressed as an annual arithmetic mean (average) as seen on Figure 6. The DAQ monitors the concentrations of NO_2 at various locations throughout the state.

Utah Monitoring Data

As shown in Figures 5 and 6, Utah has never exceeded these standards.

Figure 5. Three-Year Average Nitrogen Dioxide Hourly Averages

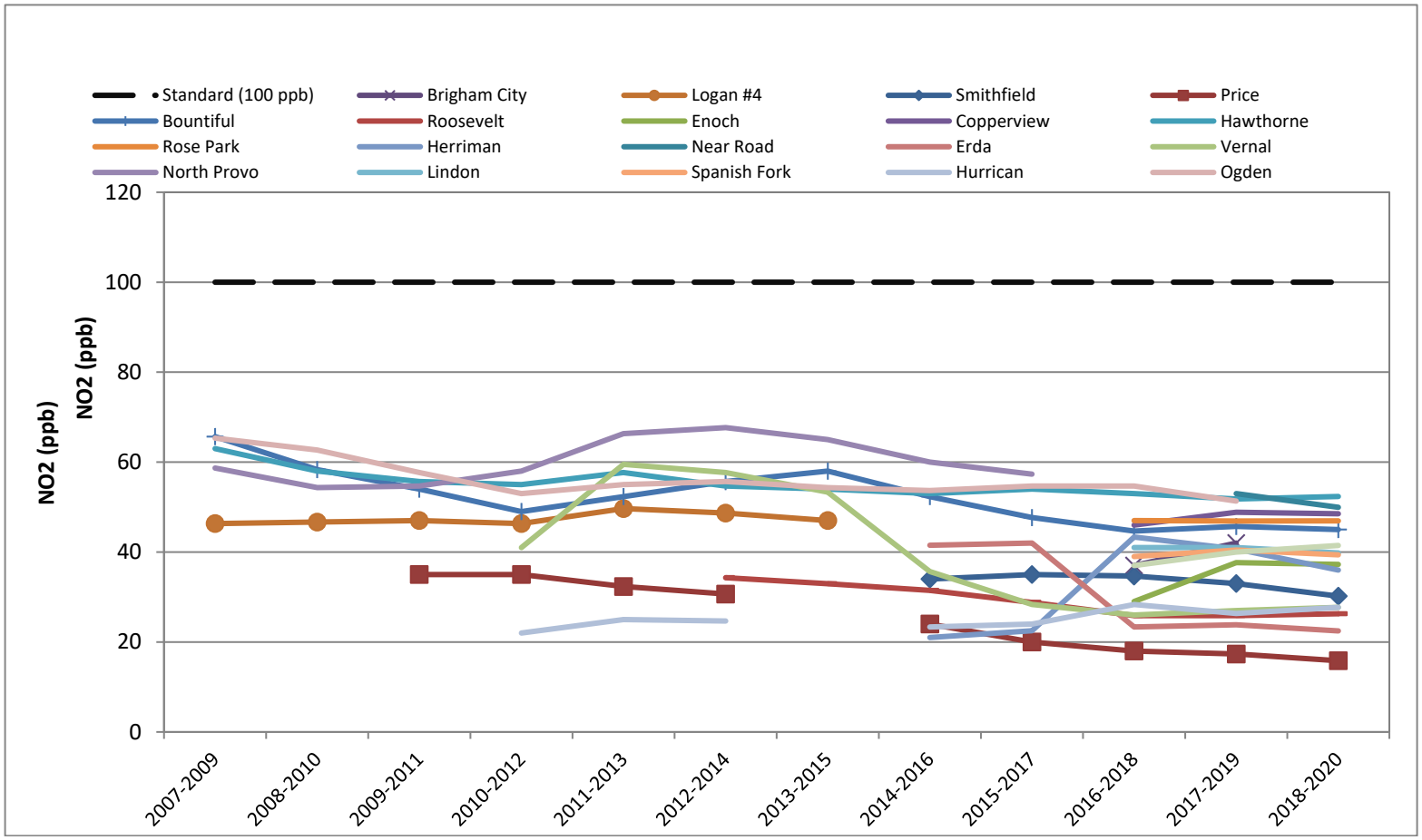
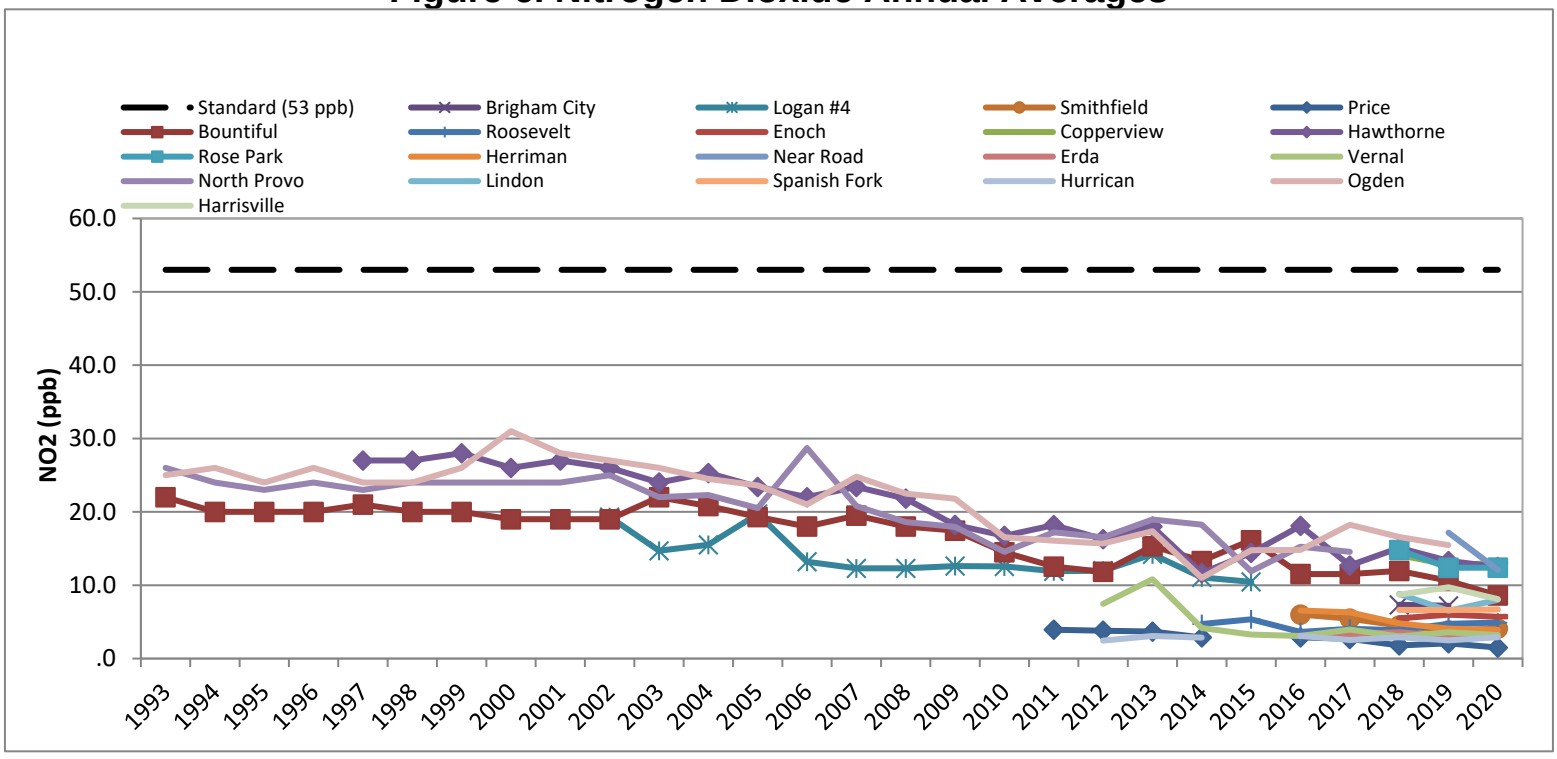


Figure 6. Nitrogen Dioxide Annual Averages



Ozone (O_3)

Ozone is a clear, colorless gas composed of molecules of three oxygen atoms. Ground-level ozone that is regulated by EPA should not be confused with the stratospheric ozone layer located approximately 15 miles above the earth's surface that shields the earth from cancer-causing ultraviolet radiation. Ground level ozone is formed by a complex chemical reaction involving VOCs and oxides of nitrogen (NO_x) in the presence of sunlight.

Some major sources for both VOCs and NO_x are vehicle engine exhaust, emissions from industrial facilities, gasoline vapors, chemical solvent use, oil and gas production, and biogenic emissions from natural sources, such as vegetative growth.

Ozone production is a year-round phenomenon, and the highest ozone levels generally occur during the summer when strong sunlight, high temperatures, and stagnant meteorological conditions combine to drive the chemical reactions and trap the air within a region for several days. However, in the past decade, it was found that under very unique circumstances, high ozone levels can occur during the wintertime. In the Uinta Basin of Utah, wintertime ozone is associated with temperature inversions, snow cover, significant VOC and NOx emissions associated with oil/gas production, and solar radiation (sunlight). Research is on-going to better understand the chemical processes that lead to wintertime ozone production. The maximum daily 8-hour monitor values for the Ouray monitor in the Uinta Basin and the Hawthorne monitor on the Wasatch Front illustrate the timing of high values in each area. Figure 10 shows that higher values in the Basin are typically seen in the winter months, whereas higher values on the Wasatch Front are typically observed in the summer.

Ozone Standards

In October of 2015, the EPA strengthened the ozone NAAQS from 75 ppb to 70 ppb, based on a three-year average of the annual 4th highest daily eight-hour average concentration. The standard was reviewed again in 2020 and the EPA chose to retain the standard at 70 ppb.

Utah Monitoring Data

Figures 7-9 show the annual 4th highest eight-hour ozone concentrations for monitors on the Wasatch Front, in the Uinta Basin, and other monitors located throughout the state. Figure 11 shows how each area compares to the NAAQS with the three-year average of the 4th highest eight-hour ozone concentration. The heavy black dashed lines indicate the previous standard of 75 ppb. The heavy red dashed line indicates the current 70 ppb standard. Ozone monitors operated by the DAQ along the Wasatch Front show exceedances of the current standard in Weber, Davis, and Salt Lake counties. There were also exceedances in Uinta County and Duchesne County during the winter. In 2016, the Governor recommended that portions of the Wasatch Front and Uinta Basin be designated nonattainment, and that the rest of the State be designated attainment/unclassifiable. In August 2018, the EPA designated portions of the Wasatch Front and Uinta Basin nonattainment for ozone. Based on monitoring data from 2018, 2019, and preliminary data from 2020, Utah County is currently attaining the ozone standard.

Figure 7. Ozone 4th Highest 8-Hour Concentration

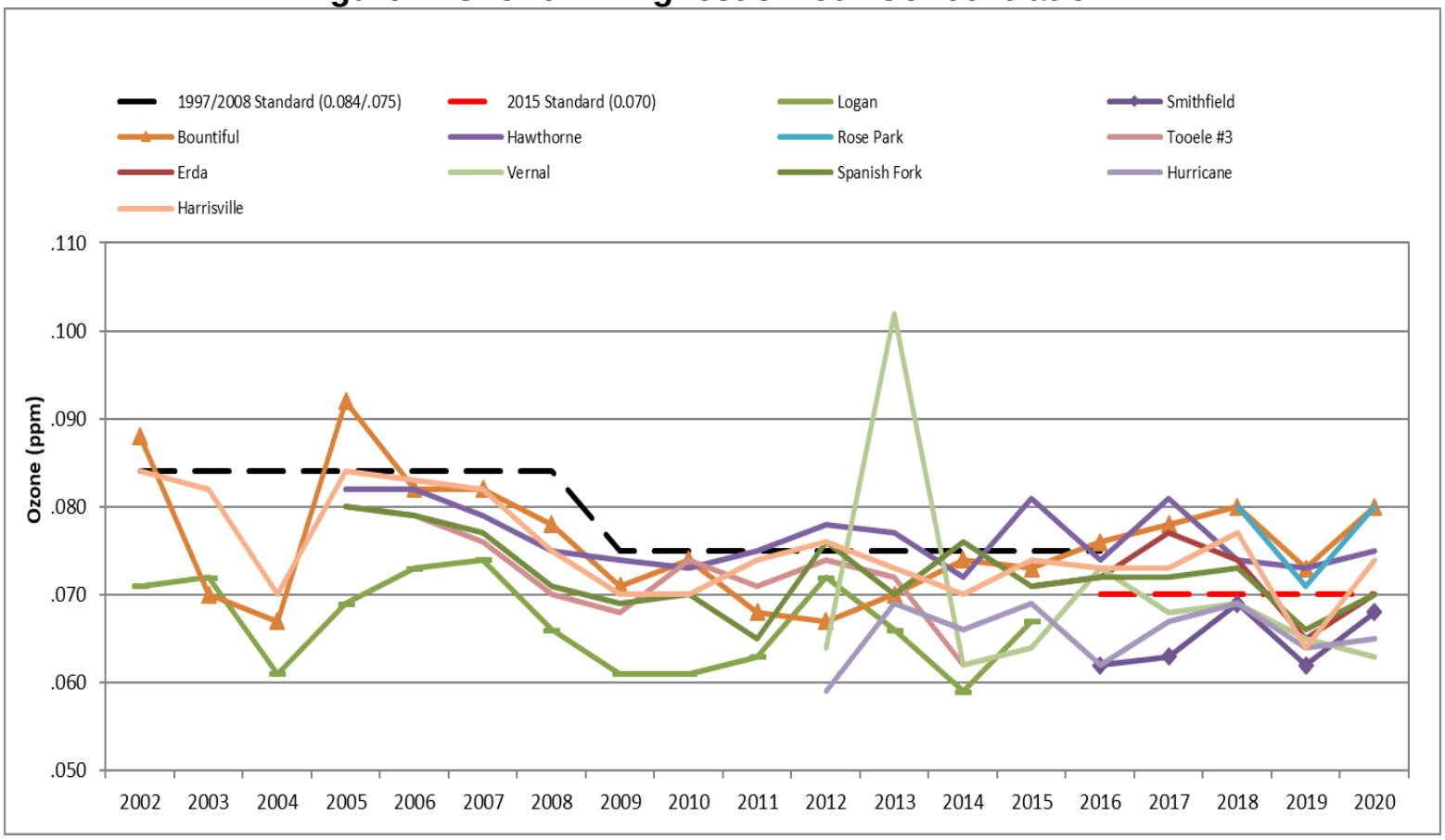


Figure 8. Ozone 4th Highest 8-Hour Concentration in Uinta Basin

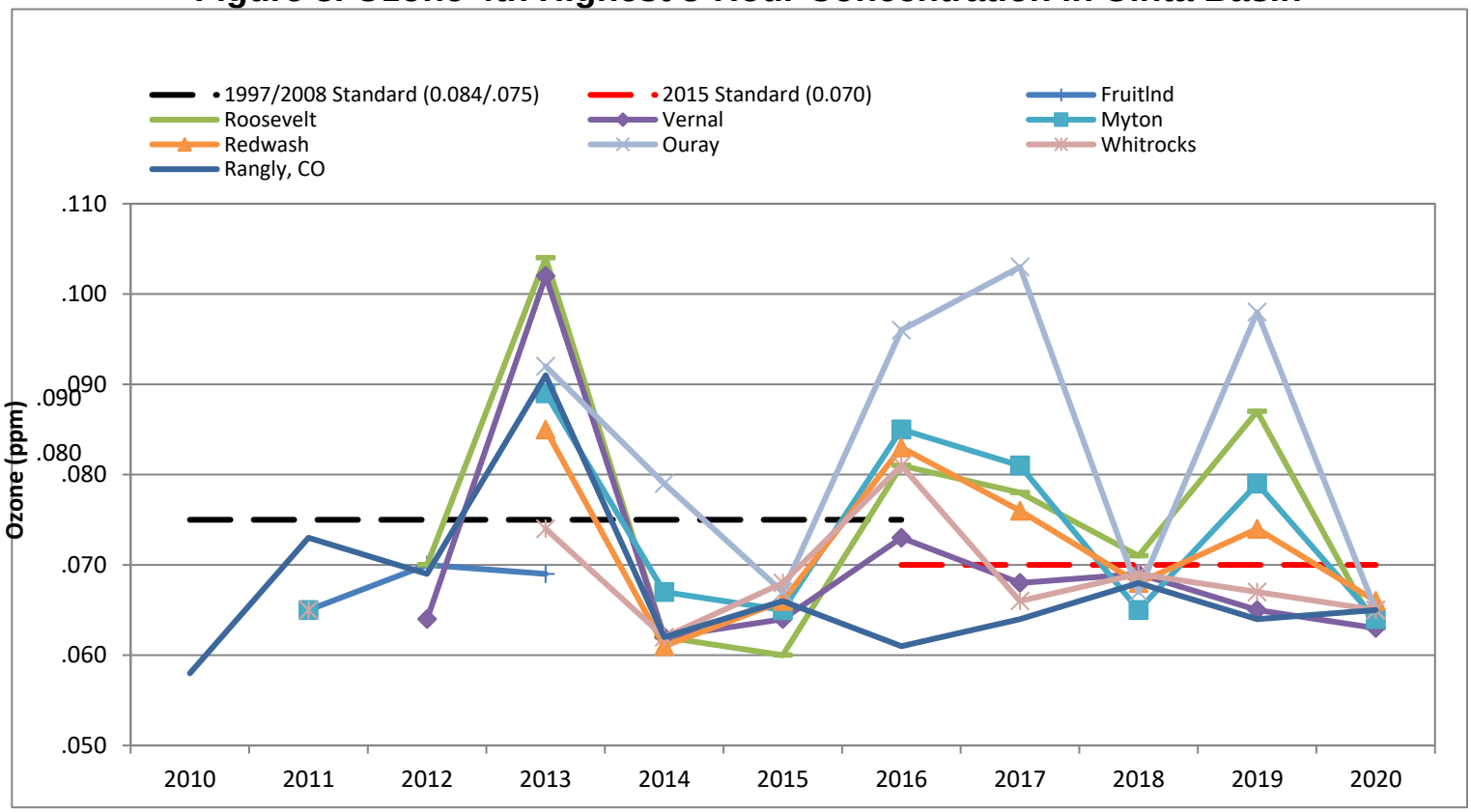


Figure 9. Ozone 4th Highest 8-Hour Concentration in Wasatch Front

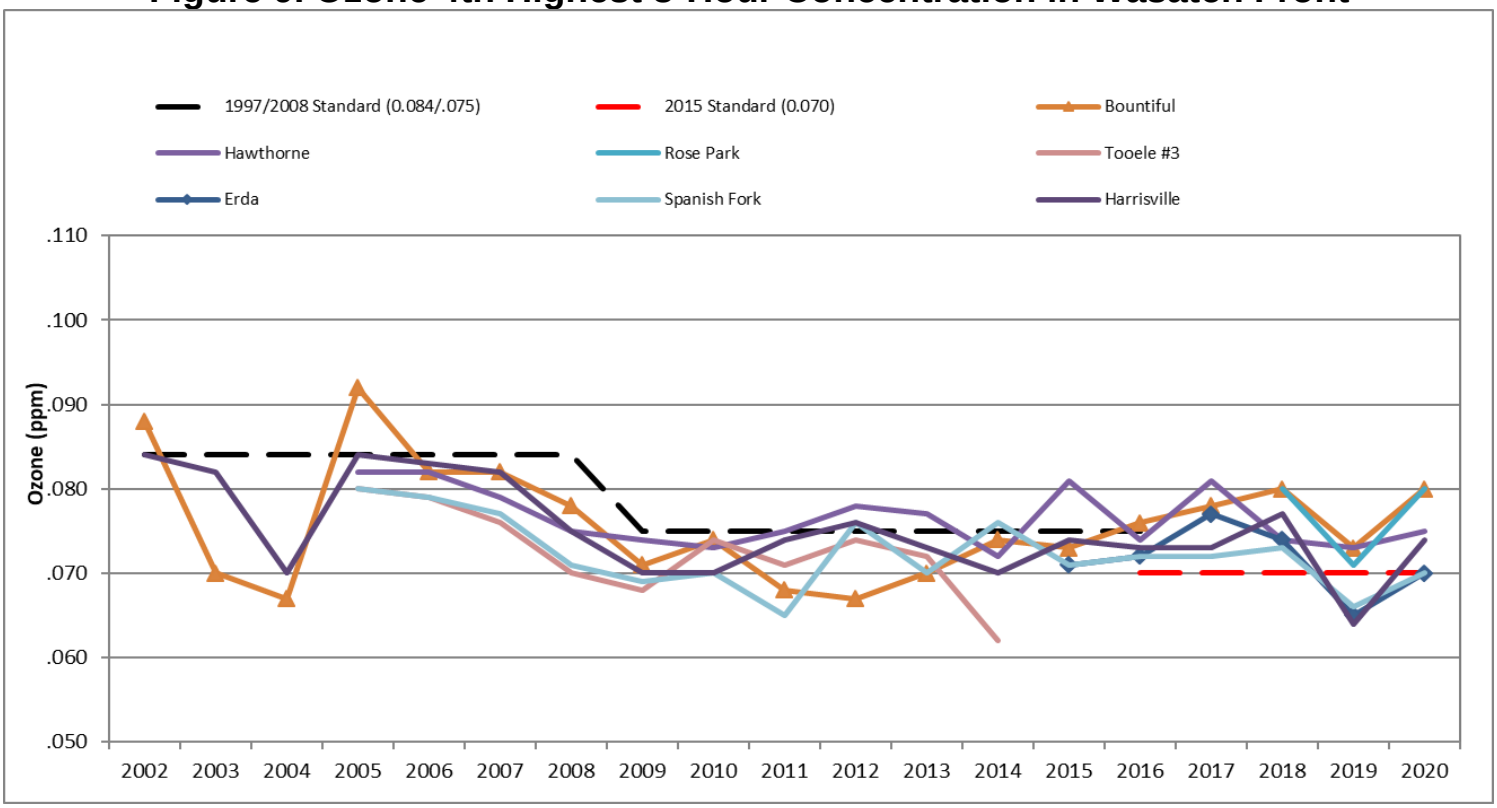


Figure 10. Daily Maximum 8-Hour Ozone Average

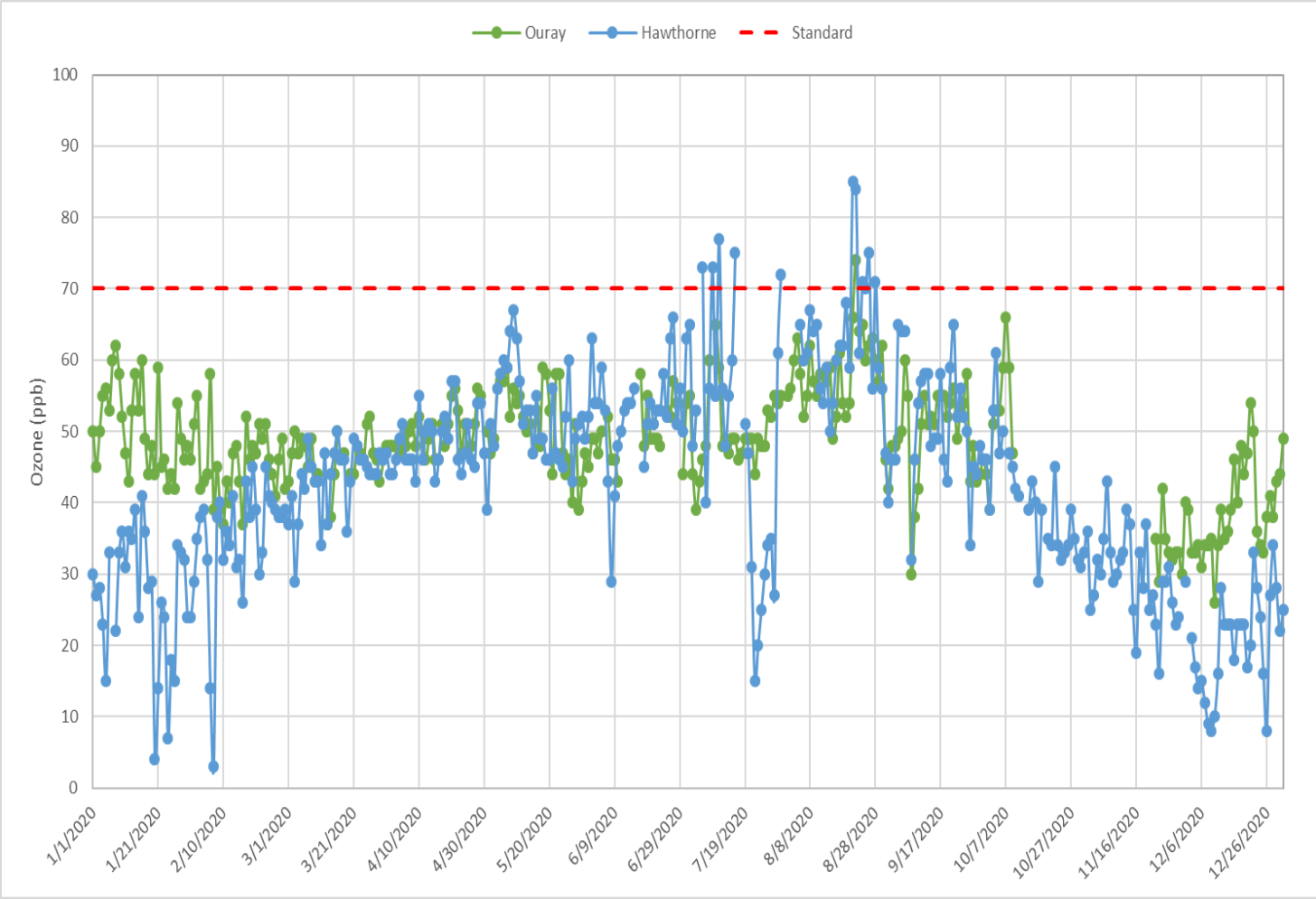
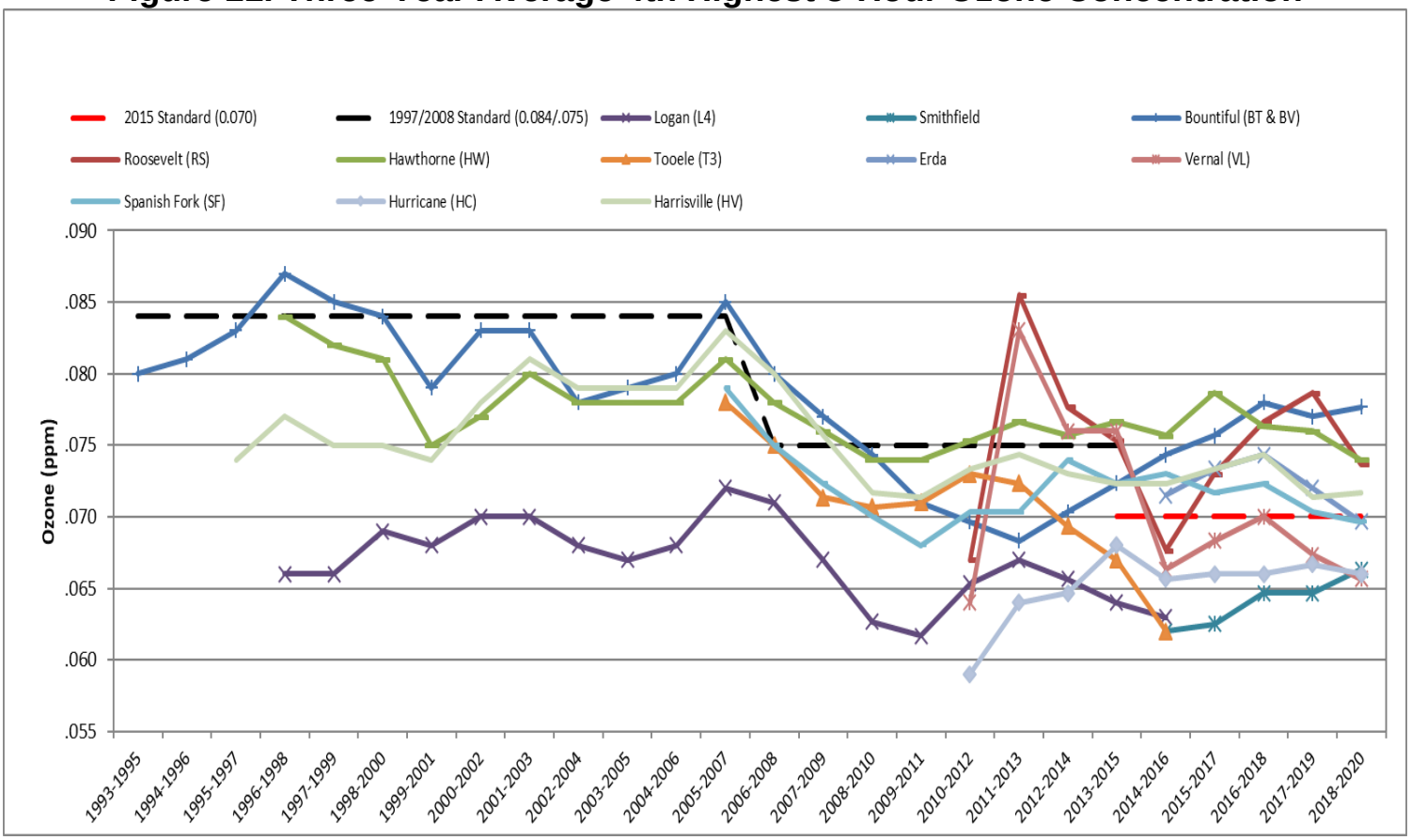


Figure 11. Three-Year Average 4th Highest 8-Hour Ozone Concentration



Particulate Matter (PM)

Regulated particulate matter is a complex mixture of extremely tiny particles of solid or semi-solid material suspended in the atmosphere and is divided into two categories: PM_{10} and $PM_{2.5}$.

PM_{10} is a particulate less than ten micrometers in diameter, which is about one-seventh the width of a strand of human hair. $PM_{2.5}$, or fine particulate, is a subset of PM_{10} that measures 2.5 microns in diameter or less. The coarse fraction of PM_{10}, which is larger than 2.5 microns, is typically made up of "fugitive dust" (sand and dirt blown by winds from roadways, fields, mining, and construction sites) and contains large amounts of silicate (sand-like) material. Primary $PM_{2.5}$ is directly emitted into the atmosphere from combustion sources such as fly ash from power plants, black carbon from cars and trucks, and soot from fireplaces and woodstoves. These particles are so small that they can become imbedded in human lung tissue, exacerbating respiratory diseases and cardiovascular problems. Other negative effects are reduced visibility and accelerated deterioration of buildings.

The majority of Utah's $PM_{2.5}$ is called secondary aerosol, meaning that it is not emitted directly as a particle, but is produced when gasses such as sulfur dioxide (SO_2), NO_x, and VOCs react with other gasses in the atmosphere, such as ammonia, to become tiny particles. Wintertime temperature inversions not only provide ideal conditions for the creation of secondary aerosols, they also act to trap air in valleys long enough for concentrations of $PM_{2.5}$ to build up to levels that can be unhealthy. The smallest of particles that make up $PM_{2.5}$ are major contributors to visibility impairment in both urban and rural areas. Along the Wasatch Front, the effects can be seen as the thick, brownish haze that lingers in our northern valleys, particularly in the winter. The DAQ currently operates PM_{10} and $PM_{2.5}$ monitors throughout the state to assess the ambient air quality with respect to the standards for both PM_{10} and $PM_{2.5}$.

Standards – PM_{10}

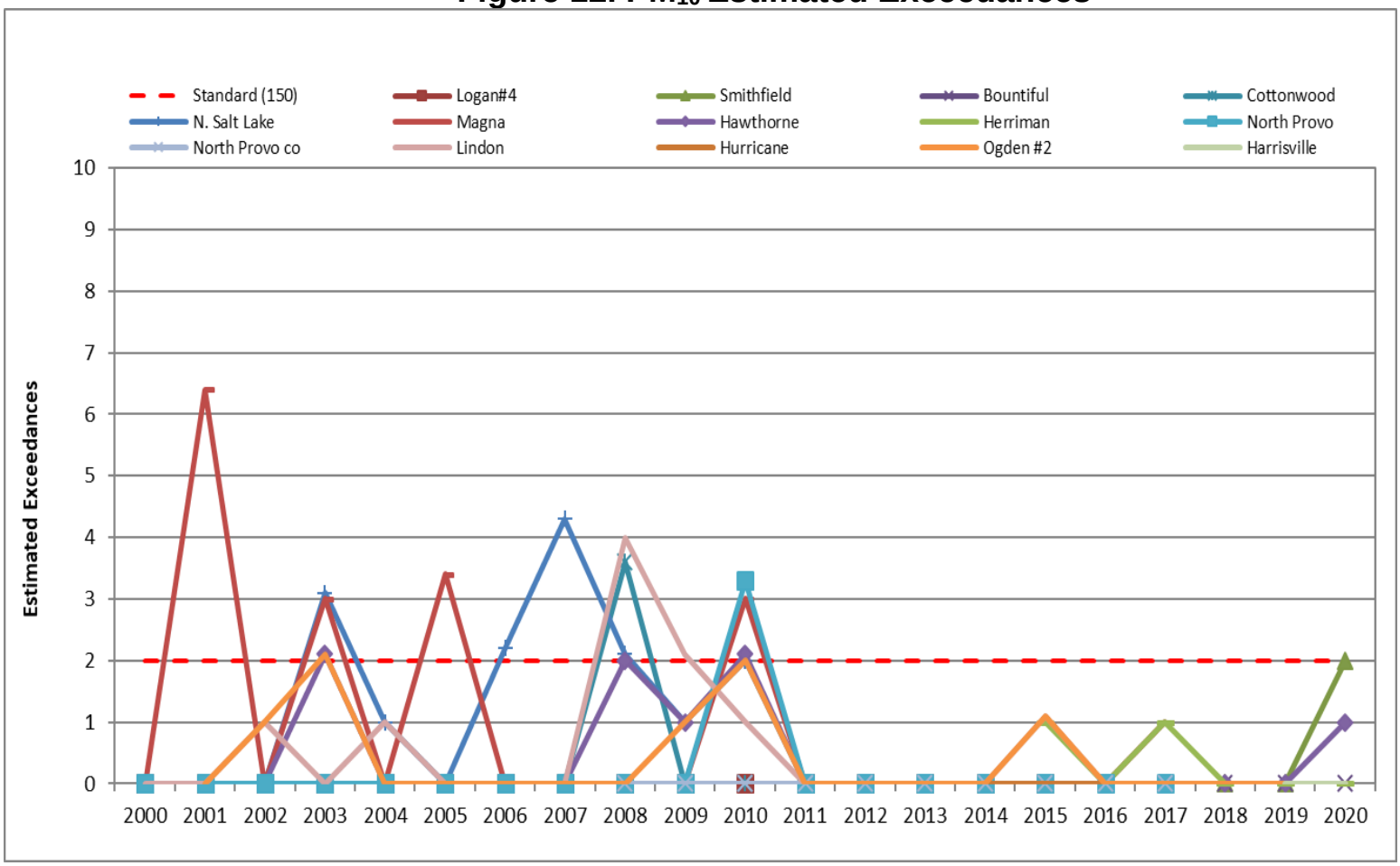
The EPA established the 24-hour air quality standard for PM_{10} in July 1987 as 150 $\mu g/m^3$. The standard is met when the probability of exceeding the standard is no greater than once per year for a three-year averaging period. In other words, four estimated exceedances within a three-year period would constitute a violation. Salt Lake County and Utah County had been designated nonattainment for PM_{10} shortly after the standard was promulgated. Ogden City was also designated as a nonattainment area due to one year of high concentrations (1992), but was determined to be attaining the standard in January 2013.

Utah Monitoring Data

State Implementation Plans (SIP) were written and promulgated in 1991, and included control strategies that were responsible for the marked decrease in PM_{10} concentrations observed in the early 1990s. Ogden City, and Salt Lake and Utah Counties were officially designated as attainment for PM_{10} effective March 27th, 2020. These three former nonattainment areas are now subject to the maintenance plans that were approved by EPA and the areas must continue to attain the standard for the first maintenance period of ten years.

High values of monitored PM_{10} sometimes result from exceptional events, such as dust storms and wildfires. This was the case in 2010, when Utah experienced an exceptional dust storm on March 30th, resulting in very high PM_{10} values across the State's air monitoring network. The DAQ has flagged data collected during exceptional events incurred from 2008 through 2011 and in 2015. Those events are currently under review for exclusion per the EPA Exceptional Event Rule. There were no exceptional events for high-wind in 2016 through 2020. Figure 12 shows the PM_{10} estimated exceedances at monitored sites in Utah since 2000.

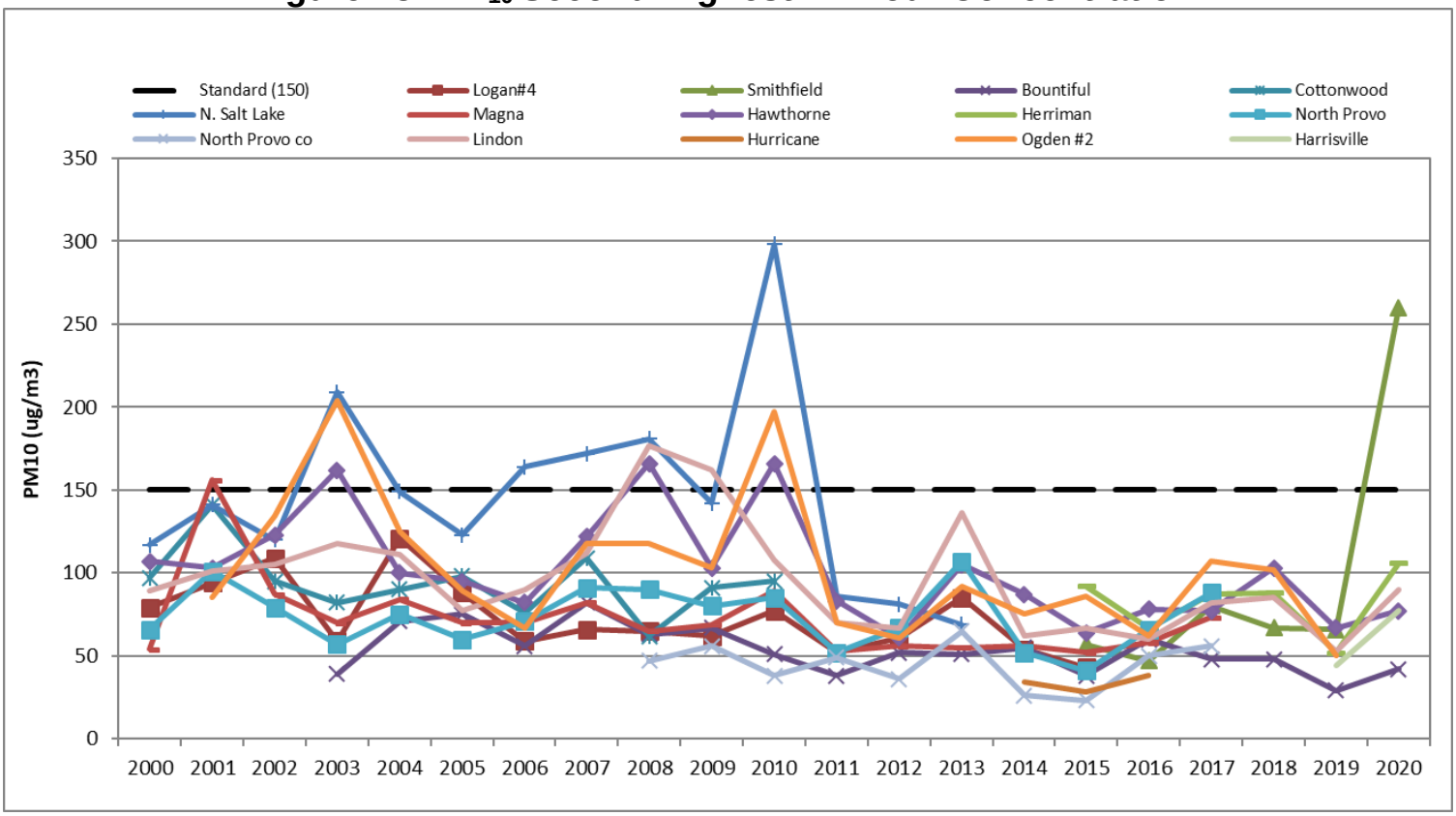
Figure 12. PM_{10} Estimated Exceedances



The statistical form of the standard essentially allows for one exceedance per year, regardless of how high the value may be. For this reason, it is often useful to look at the second highest value collected at a particular location.

Figure 13 shows the second highest 24-hour PM_{10} concentrations recorded at each station since 2000. The heavy dashed line indicates the NAAQS.

Figure 13. PM_{10} Second Highest 24-Hour Concentration



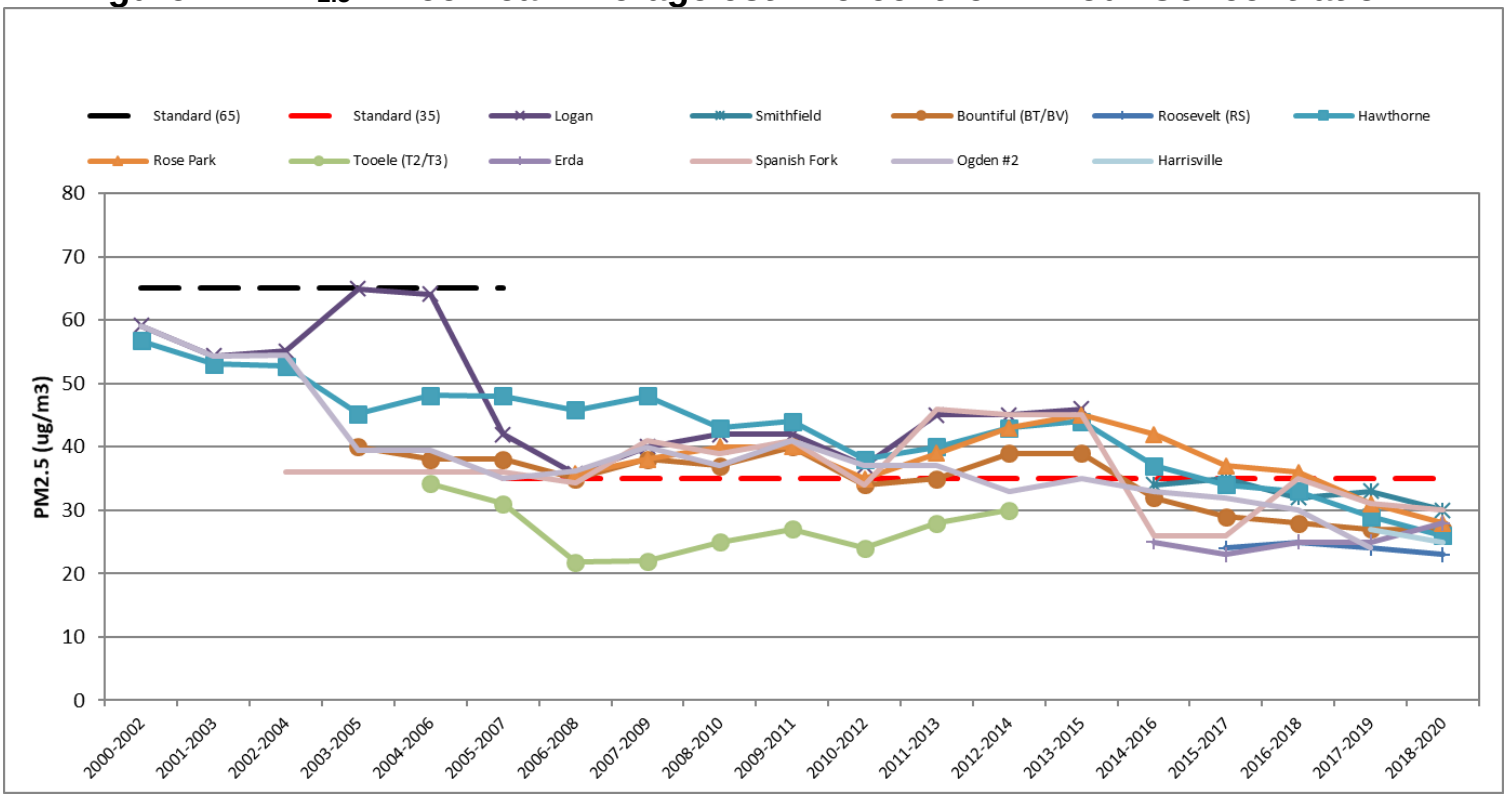
Standards – $PM_{2.5}$

The EPA first established standards for $PM_{2.5}$ in 1997. In 2006, the EPA lowered the 24-hour $PM_{2.5}$ standard from 65µg/m^3 to 35 µg/m^3. In 2012, the EPA lowered the annual standard from 15µg/m^3 to 12µg/m^3. The $PM_{2.5}$ NAAQS underwent a review in 2020 and the standards were retained. Both standards are evaluated by considering monitored data collected during a three-year period. This minimizes the effects of year-to-year meteorological variability. The 24-hour standard is met when the average of 98th percentile values collected for each of the three years is less than or equal to 35 µg/m^3. The 98th percentile concentration for each year is selected from all of the data recorded at a given monitor, such that the values of at least 98 percent of all that data are of a lower concentration.

Utah Monitoring Data

Figure 14 shows that all monitors in Utah are in compliance with the 1997 standard. The three- year averages from 2018-2020 show that all monitors are in compliance with the 2006 standard.

Figure 14. $PM_{2.5}$ Three-Year Average 98th Percentile 24-Hour Concentration



The annual standard is met when the three-year average of annual mean concentrations is no greater than 12µg/m^3.

Figures 15 and 16 show that all locations meet the annual standard.

Figure 15. $PM_{2.5}$ Annual Mean Concentration

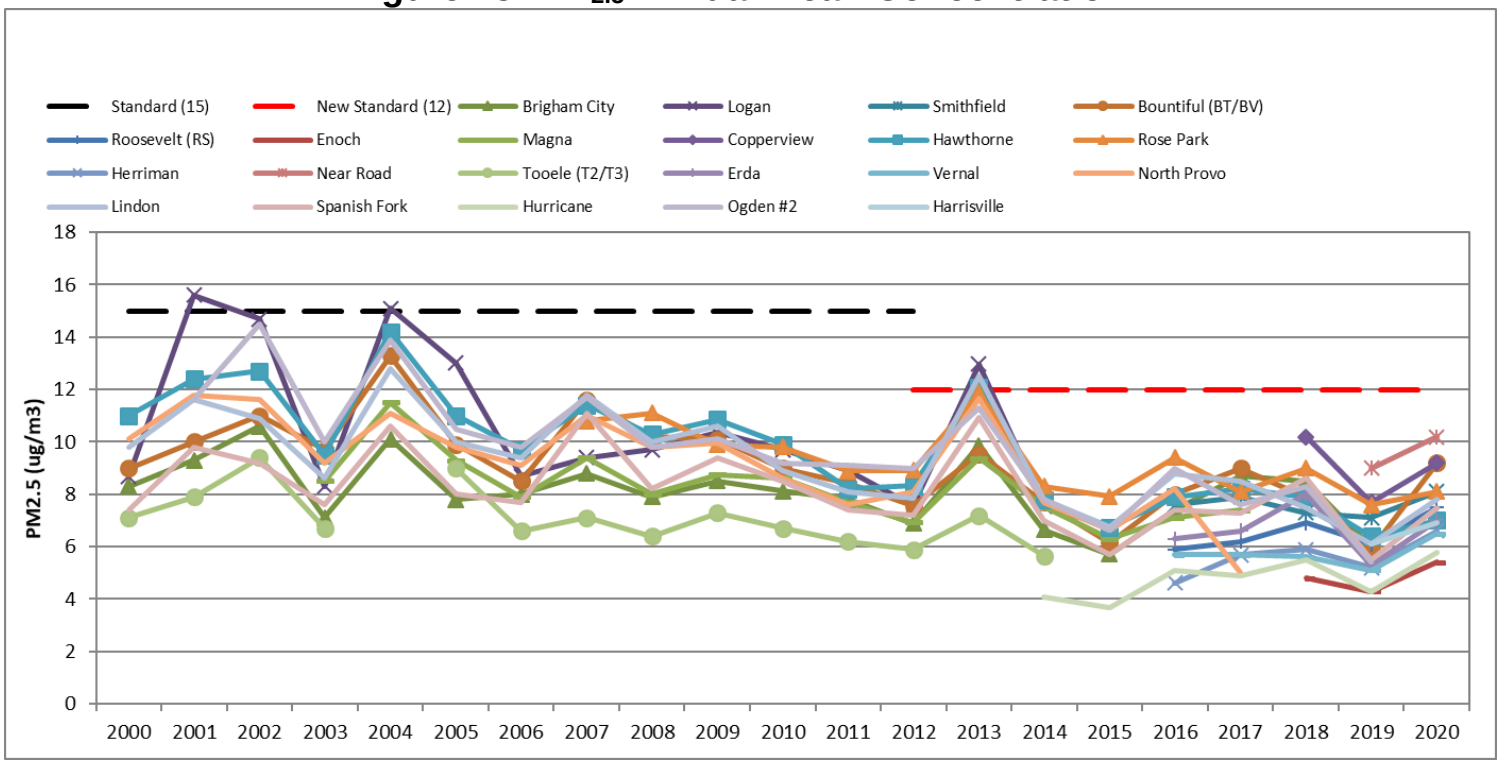
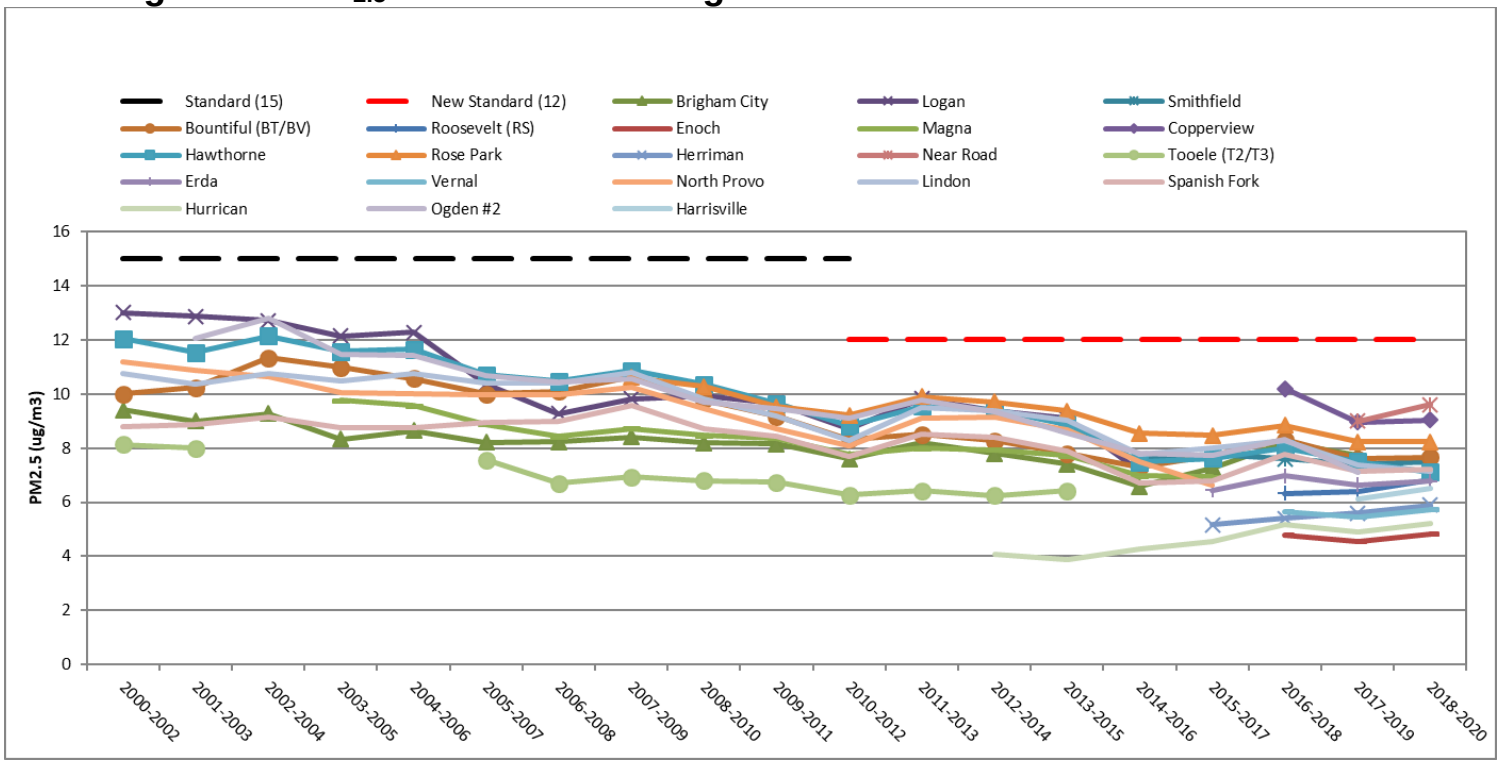


Figure 16. $PM_{2.5}$ Three-Year Average of the Annual Mean Concentration



Also illustrated in Figures 15 and 16 is a downward trend in the annual mean concentrations. This is interesting to note because trends in the annual averages are not as easily obscured by short term meteorology as are trends in the 24-hour values. This downward trend is likely also indicative of trends in 24-hour concentrations, absent the influence of year-to-year variability in the severity of wintertime cold pool (inversion) conditions.

EPA has proposed that the Salt Lake and Provo nonattainment areas be redesignated to attainment status. The final rule is expected to be published in the Federal Register in early 2021. The Logan nonattainment areas will likely be proposed for redesignation to attainment in early 2021 as well.

Sulfur Dioxide (SO_2)

Sulfur dioxide is a colorless gas with a pungent odor. In the atmosphere, sulfur dioxide is easily converted into sulfates, which are detected as particulates. It is also converted into sulfuric acid, the major acidic component of acid rain. It is emitted primarily from stationary sources that burn fossil fuels such as power plants and refineries. SO_2 is also a byproduct of copper smelting. Diesel fuel and, to a lesser extent, gasoline contain sulfur and are considered contributors to sulfur dioxide in the atmosphere.

Standards

In 1971, EPA established a 24-hour average SO_2 standard of 0.14 ppm, and an annual arithmetic average standard of 0.030 ppm. In 2010, EPA revised the primary standard for SO_2, setting it at 75 ppb for a three-year average of the 99th percentile of the annual distribution of daily maximum one-hour average concentrations for SO_2. The secondary standard is a three-hour standard of 0.5 ppm and is not to be exceeded more than once per year.

Utah Monitoring Data

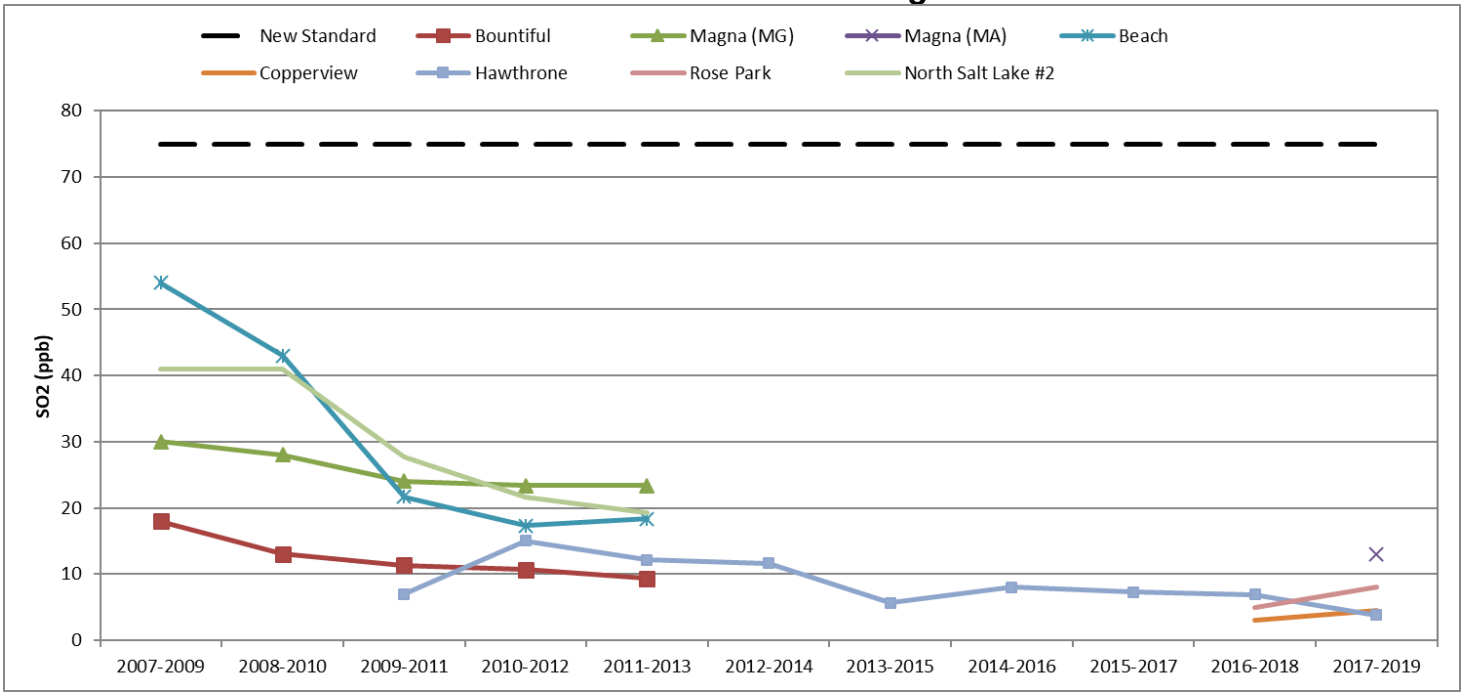
Throughout the 1970s, the Magna monitor routinely measured violations of the 1971 24-hour standard. Consequently, all of Salt Lake County and parts of eastern Tooele County above 5,600 feet were designated as nonattainment for that standard. Two significant technological upgrades at the Kennecott smelter costing the company nearly one billion dollars resulted in continued compliance with the SO_2 standard since 1981. In the mid-1990s, Kennecott, Geneva Steel, the five refineries in Salt Lake City, and several other large sources of SO_2 made dramatic reductions in emissions as part of an effort to curb concentrations of secondary particulates (sulfates) that were contributing to PM_{10} violations. More recently, Kennecott closed Units 1, 2, and 3 of its coal-fired power plant in 2016, and it closed Unit 4 in 2019, resulting in further SO_2 emissions reductions.

Utah submitted an SO_2 Maintenance Plan and re-designation request for Salt Lake and Tooele Counties to the EPA in April of 2005, but EPA never took formal action on the request. Because of changes in the emissions in subsequent years, and changes in the modeling used to demonstrate attainment of the standard, in November, 2019, the State of Utah withdrew the 2005 Maintenance Plan and re-designation request. DAQ is currently working very closely with EPA to develop a new maintenance plan and redesignation request to address the 1971 standard. DAQ will conduct modeling and other analyses in 2021 with the goal of submitting an approvable maintenance plan and redesignation request to EPA by the end of that year.

On November 1, 2016, Governor Herbert submitted a recommendation to EPA that all areas of the state be designated as attainment for the 2010 SO_2 NAAQS based on monitoring and air quality modeling data. On January 9, 2018, EPA formally concurred with this recommendation and designated all areas of the state attainment/unclassifiable.

Figure 17 shows the most current measurements to compare against the primary SO2, NAAQS of 75 ppb.

Figure 17. Sulfur Dioxide Three-Year Average of 99th Percentile of Daily Maximum One-Hour Averages



Lead (Pb)

Lead in the ambient air exists primarily as particulate matter in the respirable size range. Historically, the major source of lead emissions came from the burning of leaded gasoline. However, because leaded gasoline for automobiles was completely phased out in the U.S. by the end of 1995, lead from gasoline is no longer a significant problem. Currently, the primary source of lead emissions in Utah is the extraction and processing of metallic ores. Exhaust from small aircraft is another source of lead emissions in the state. Utah has not exceeded the health standard for lead since the late 1970s, and the EPA authorized the discontinuation of lead monitoring in Utah in 2005; however, in both 2008 and 2010, the EPA set new monitoring requirements for lead, and the DAQ resumed monitoring in 2010.

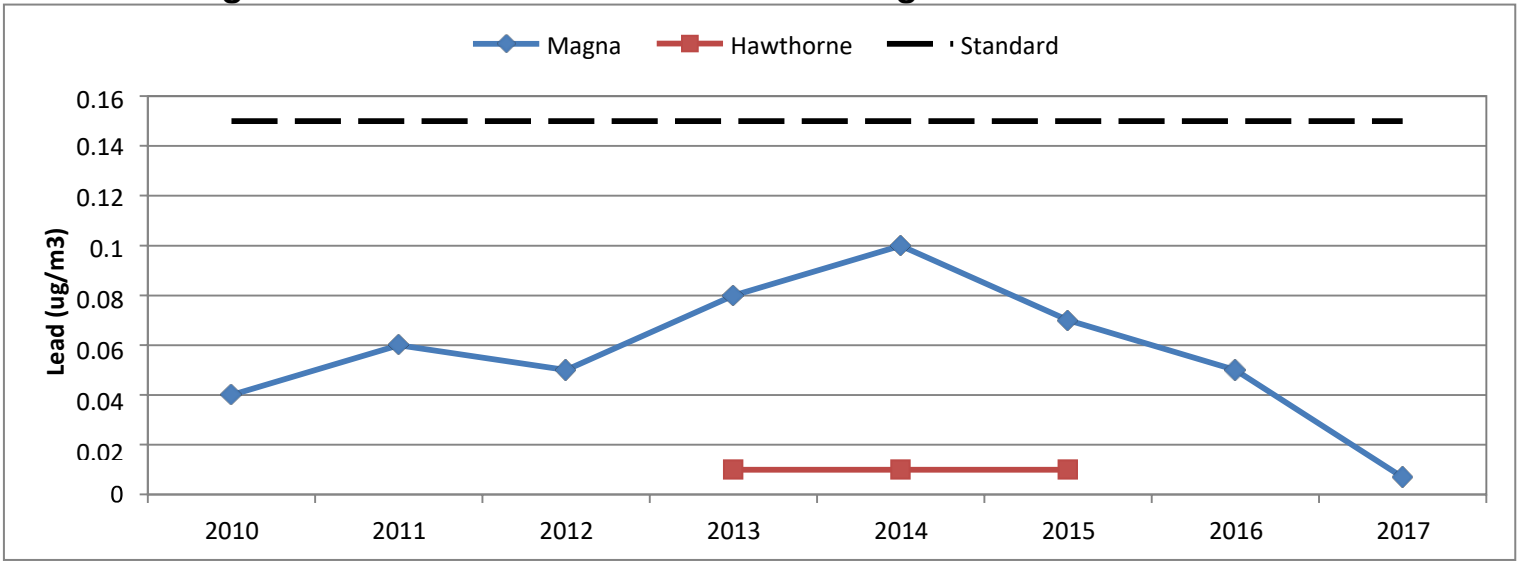
Standards

On November 12, 2008, the EPA strengthened the NAAQS for lead. The previous standard was a calendar quarter (three-month) average concentration not to exceed 1.5 $\mu g/m^3$. The new standard is 0.15 $\mu g/m^3$ as total suspended particles (TSP), measured as a three-month rolling average.

Utah Monitoring Data

The new standard included a new monitoring requirement, so the DAQ began lead monitoring again at the Magna station near the Kennecott copper smelter (See Figure 18). Data was collected from January 2010 through June 2017, at which time DAQ was able to demonstrate the likelihood of violating the standard was so remote, it would no longer be necessary to run the monitor. With EPA's concurrence, the Magna lead monitor was shut down in June 2017. UDAQ and EPA continue to monitor requirements, such as source emission thresholds, population, and NAAQS revisions that may trigger the necessity to resume monitoring lead in Utah.

Figure 18. Lead Max Three-Month Average 24-Hour Concentration



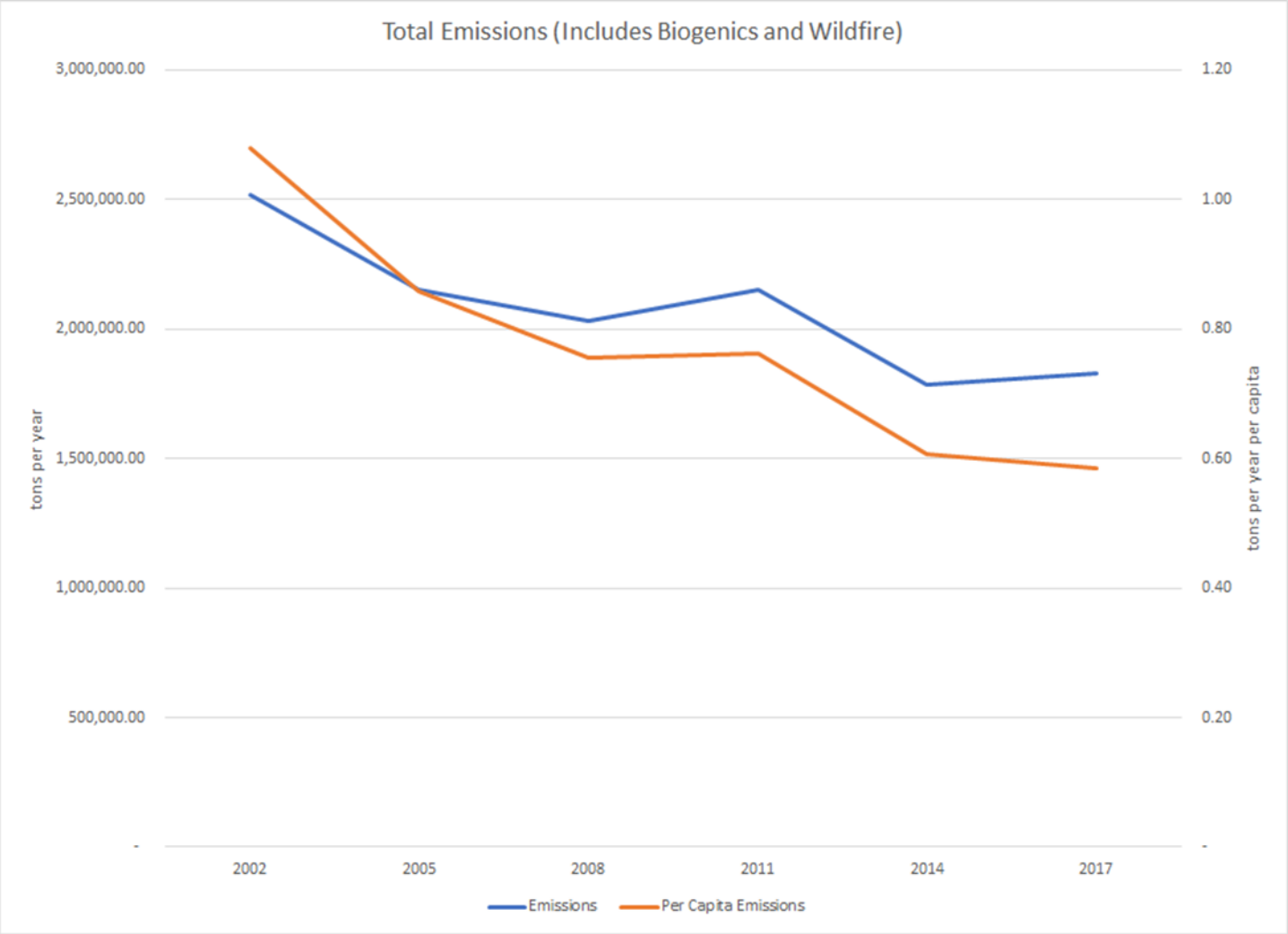
Emissions Inventories

Every three years, EPA develops the National Emissions Inventory (NEI), and requires each state to submit its inventory data into the NEI directly. To do so, the DAQ collects information about the quantity and characteristics of the various air pollutants released by all emission sources in the state. In addition to these triennial inventories, emissions information is also collected annually from the largest industrial sources to meet the fee requirements of Title V, Operating Permits, of the CAA, or requirements in various sections of the SIP. Finally, additional detailed inventories are prepared, as needed, for special projects such as SIP development, to quantify emissions during specific seasonal air pollution episodes. Much of this data is uploaded into the NEI annually, as available.

Once collected, the inventory information is reviewed, quality assured, analyzed, stored in the DAQ data system and the NEI, if required, and made available to the public. The DAQ uses this emissions information to review trends over time, as input data for air quality modeling analysis and as an indicator of the effectiveness of existing and projected control strategies.

Figure 19: Total Emissions

Figure 19 shows total statewide emissions (including all anthropogenic sources, biogenics, and wildfires) and per capita emissions from the same sources from 2002 through 2017. Despite a 34% increase in population over this period, total statewide emissions declined by 27.3%, resulting in a 45.7% reduction in per capita emissions.



Sources of Air Contaminants

Emission inventories are typically organized into three types of sources: Point, Area, and Mobile.

Point sources are stationary industrial or commercial sites, such as power plants, refineries, and manufacturing facilities. They emit more than 100 tons per year of a regulated pollutant, or are otherwise federally required to submit an inventory. Air pollutants released from these sources are reported directly to DAQ staff through the State and Local Emissions Inventory System (SLEIS). The mobile sector consists of emissions from non-stationary sources such as cars, trains, and aircraft. Mobile emissions are further broken down into on-road, non-road, and VOC refueling categories. On-road mobile sources primarily consist of personal and commercial cars and trucks, and contribute the largest part of the mobile source emissions. Non-road mobile sources consist of a diverse group of heavy construction equipment, small engines (lawnmowers and snow blowers), trains, and aircraft. VOC refueling emissions are vapors

released from gasoline tanks of mostly older vehicles without on-board refueling vapor recovery technology.

Estimating emissions from mobile sources requires understanding vehicle emission characteristics and knowing their model years. It is also necessary to know how they are driven, where they are driven, and the distances they are driven. On-road mobile sources produce about 39% of the annual man-made pollution (NOx, $PM_{2.5}$ exhaust, and VOC) along the Wasatch Front. Although heavy-duty diesel vehicles account for only 7.5% of the vehicle miles travelled, they produce over 30% of the pollution. Mobile sources have historically been the largest source of emissions in areas not meeting the NAAQS, but with the implementation of federal emissions standards and the introduction of Tier 3 fuel in Utah, this will change over the next few years.

Area sources are generally much smaller stationary sources, and due to their greater number, are generally accounted for in a group. However, as the NAAQS become more restrictive, it is necessary to start tracking emissions more closely from smaller industrial sources. Additionally, as mobile source emissions drop, area sources are quickly becoming the largest source of emissions. Home heating, agricultural burning and harvesting, construction, residential and commercial energy generation, wildfires, and biogenics (emissions from vegetation) are examples of area source categories. The upstream oil and gas inventory is unique in the area source inventory because rather than using surrogate activity data and generic emission factors, oil and gas companies submit an inventory for their facilities.

Triennial Emissions Inventory

Under current federal law, Utah is required to collect a statewide emission inventory every three years.

The 2017 triennial inventory is the most recent statewide inventory available. The 2017 triennial inventory covers 486 individual point sources, 128 area categories, 65 oil and gas categories, 32 on-road categories, and 215 non-road categories. Table 4 shows total emissions, by county, of the criteria pollutants, CO, NO_x, PM_{10}, $PM_{2.5}$, SO_2, and VOCs. Figure 16 shows the 2017 triennial emissions inventory in six pie charts, displaying the relative proportion of emissions generated within source categories.

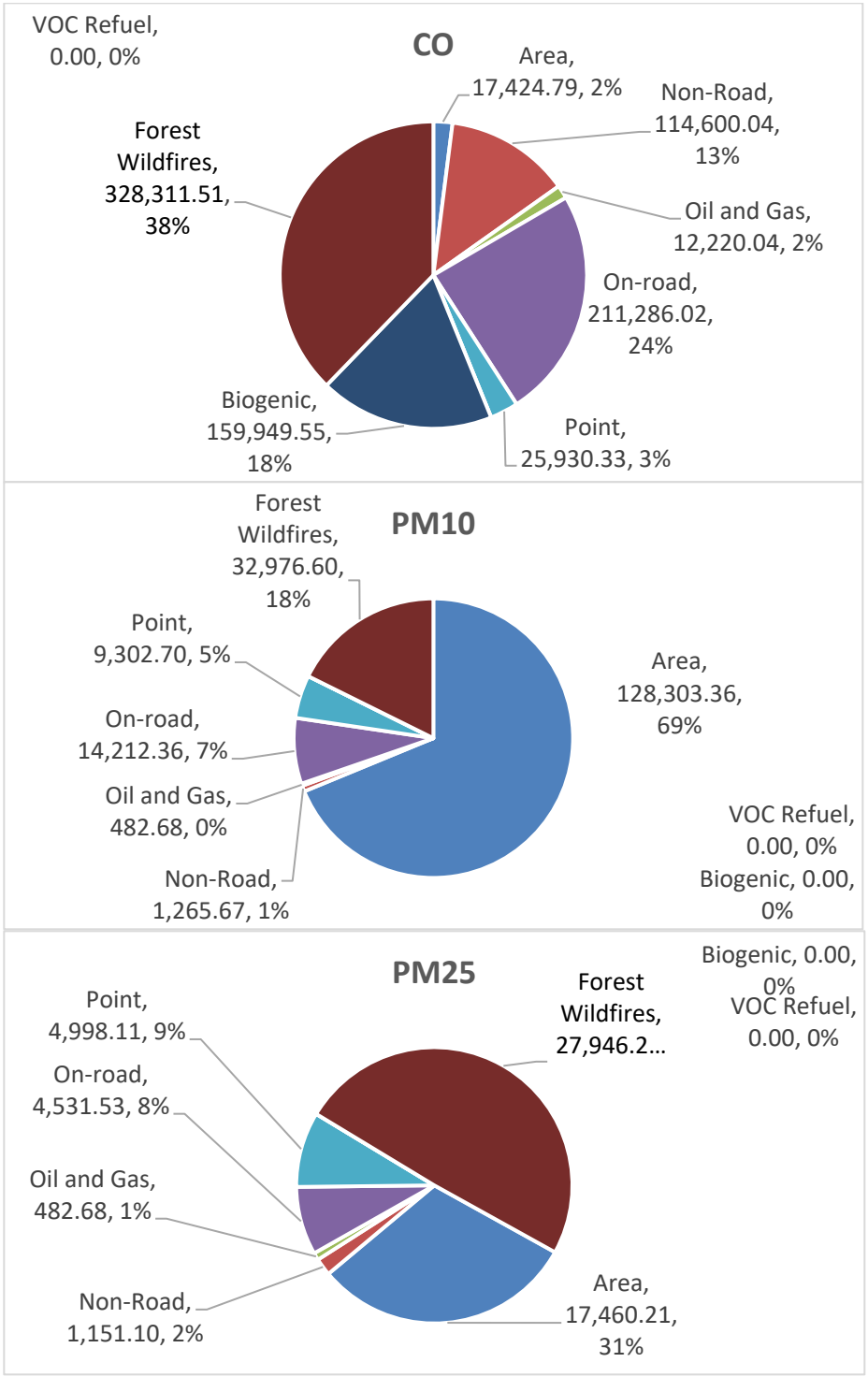
The figures in the charts represent statewide annual emissions and should not be compared to the inventories used in the $PM_{2.5}$ or other SIPs, which are seasonal and area specific. Biogenic and wildfire emissions produced from non-anthropogenic (non-human) natural activity are usually estimated as segments within the area source category, but have been listed separately due to their unique nature and impact.

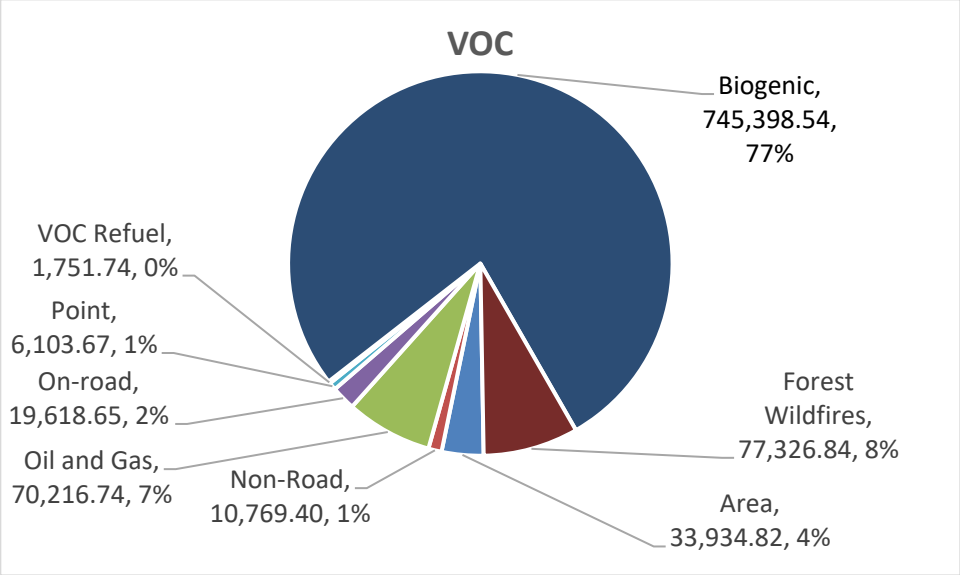
Table 4. 2017 Triennial Inventory (tons/year)

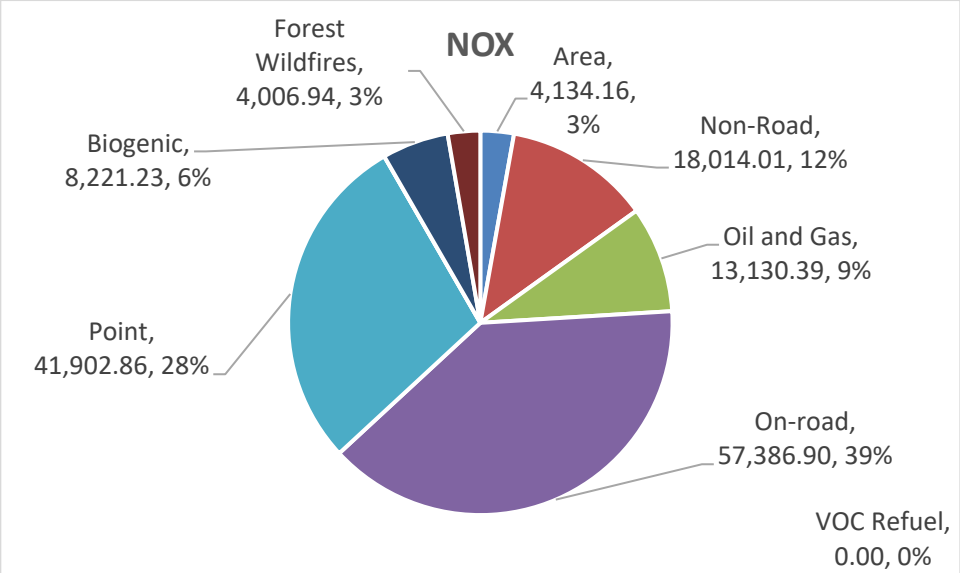
County Name	CO	NOx	PM_{10}	$PM_{2.5}$	SO2	VOC
Beaver	9,360.74	2,009.93	3,211.75	553.44	9.49	27,597.62
Box Elder	29,756.51	4,893.39	9,151.64	2,202.54	181.12	40,317.99
Cache	14,704.70	2,188.78	8,843.71	1,337.11	41.86	11,782.56
Carbon	7,606.01	2,620.92	4,464.61	645.22	488.50	17,147.58
Daggett	2,441.85	820.89	545.94	88.77	2.79	9,520.50
Davis	29,981.77	6,564.15	3,399.96	927.99	165.36	11,780.94
Duchesne	13,842.39	7,936.32	6,944.39	1,139.99	39.43	37,532.62
Emery	20,083.59	17,983.29	7,244.46	1,447.11	5,802.28	36,752.05
Garfield	53,913.49	1,289.40	6,983.94	4,006.81	321.32	55,625.73
Grand	13,709.56	2,736.21	3,801.89	518.30	7.59	40,977.97
Iron	252,692.12	6,362.13	27,887.93	20,471.68	1,560.09	90,072.73
Juab	12,444.25	2,495.00	2,531.27	472.68	18.52	33,614.21
Kane	11,520.10	884.30	3,695.19	452.89	8.09	42,417.16
Millard	28,407.38	15,312.98	6,705.59	2,018.81	2,536.65	64,439.92
Morgan	3,970.71	2,223.11	1,117.82	173.63	199.60	7,326.22
Piute	3,930.51	194.87	1,072.74	288.47	14.66	8,719.54
Rich	3,125.76	251.00	1,746.98	291.66	0.80	7,646.69
Salt Lake	109,695.71	24,583.24	17,073.58	4,358.27	2,486.93	29,580.19
San Juan	21,136.43	1,945.59	7,122.89	936.52	19.40	77,783.03
Sanpete	7,000.29	1,017.08	4,913.45	660.74	15.72	17,057.26
Sevier	10,203.59	1,805.23	5,185.07	926.44	41.59	18,504.12
Summit	13,290.35	3,708.91	3,714.32	814.08	168.80	17,241.56
Tooele	33,952.33	5,774.69	7,645.79	2,681.10	202.63	48,353.36
Uinta	19,666.77	7,907.88	6,882.60	1,243.95	39.48	93,036.36
Utah	76,172.07	11,694.28	17,367.10	4,895.68	312.07	36,544.60
Wasatch	7,122.20	1,090.87	4,029.14	571.15	11.94	13,626.37
Washington	28,966.24	4,944.07	7,440.27	1,201.15	36.47	39,292.90
Wayne	5,507.90	492.76	1,265.28	184.96	2.98	20,018.24
Weber	25,369.66	4,627.14	4,399.39	996.83	34.91	10,779.62
Total	**869,574.96**	**146,358.40**	**186,388.71**	**56,507.96**	**14,771.06**	**965,089.67**
Multiple (portable facilities)	147.32	438.10	154.66	61.89	76.53	30.72
Grand Total	**869,722.29**	**146,796.50**	**186,543.37**	**56,569.85**	**14,847.58**	**965,120.39**

The triennial inventory for 2017 changed this year because of updated EPA calculations for wildfires, locomotives, and airport equipment. Point sources were also subtracted from Area source data.

Figure 20. 2017 Triennial Emissions Inventory by Source Category – Statewide, Annual (tons/year)




VOC
Biogenic, 745,398.54, 77%
VOC Refuel, 1,751.74, 0%
Point, 6,103.67, 1%
On-road, 19,618.65, 2%
Oil and Gas, 70,216.74, 7%
Non-Road, 10,769.40, 1%
Area, 33,934.82, 4%
Forest Wildfires, 77,326.84, 8%


NOX
Forest Wildfires, 4,006.94, 3%
Area, 4,134.16, 3%
Non-Road, 18,014.01, 12%
Biogenic, 8,221.23, 6%
Oil and Gas, 13,130.39, 9%
Point, 41,902.86, 28%
On-road, 57,386.90, 39%
VOC Refuel, 0.00, 0%

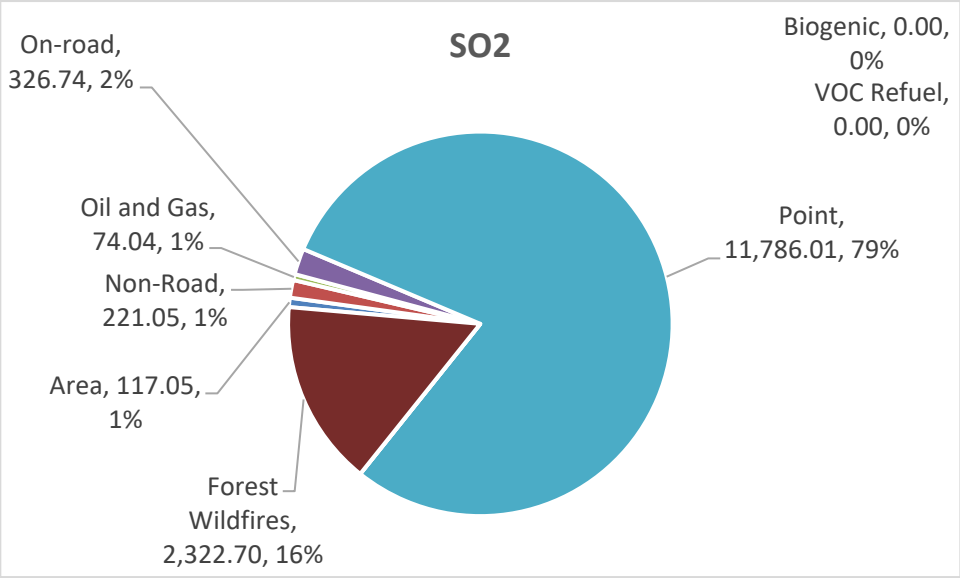
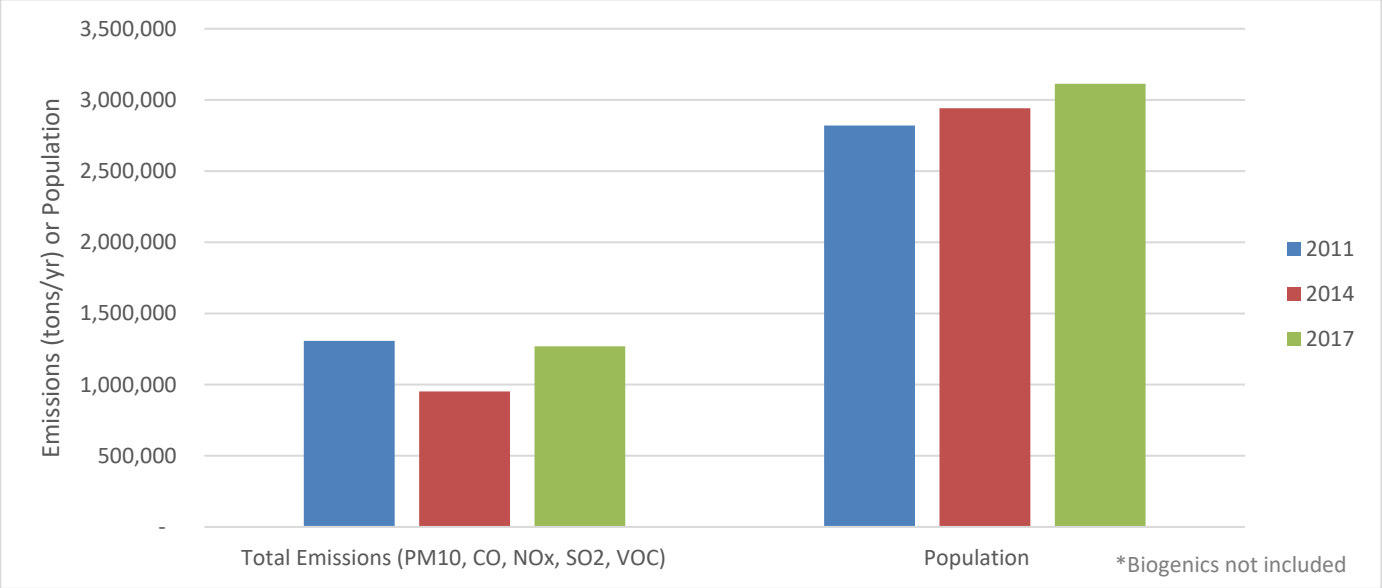

SO2
On-road, 326.74, 2%
Biogenic, 0.00, 0%
VOC Refuel, 0.00, 0%
Oil and Gas, 74.04, 1%
Point, 11,786.01, 79%
Non-Road, 221.05, 1%
Area, 117.05, 1%
Forest Wildfires, 2,322.70, 16%

Figure 21: Statewide Population Growth vs. Emissions Reductions



Division Organization

The DAQ is divided into three branches: Planning, Compliance, and Permitting.

The *Planning Branch* is responsible for developing and coordinating the implementation of comprehensive plans to reduce air pollution and collecting and analyzing the data necessary to show the effectiveness of those plans. The Planning Branch is organized into three sections. The *Air Monitoring Section* is responsible for establishing and operating the monitoring network to gather and analyze data used to determine ambient concentrations of air pollutants, as well as meteorological conditions when those pollution concentrations occurred. The *Inventory Section* has the primary responsibility to collect and collate emissions inventories in order to understand the origins of the various contaminants detected in the air. This includes both historic inventories and projection inventories, reflecting current and proposed control strategies. The *Technical Analysis Section* refines and analyzes available emissions inventories and monitoring data, using computer models to evaluate the impacts of new and existing sources of air pollution and to understand the relationship between the emissions, meteorology, and pollutant concentrations measured in the air for past, current and future pollution episodes. The Planning Branch is also involved in identifying the air quality impacts of transportation issues, which include vehicle inspection and maintenance, clean fuels, and highway construction. The *Air Quality Policy Section* uses this information to develop SIPs in order to ensure that Utah's ambient air comes into and remains in compliance with the federal health standards. Additionally, the Air Quality Policy section coordinates all of the rule-making activities of the Division, in addition to applying for and administering all grant and incentive programs to reduce pollution.

The *Compliance Branch* is responsible for ensuring that industries and residents comply with Utah's air quality rules and is comprised of three sections: *Major Source Compliance Section*, *Minor Source Compliance Section*, and *Air Toxics, Lead-Based Paint, and Asbestos Section (ATLAS)*. The Major and Minor Source Compliance sections are responsible for ensuring that all Utah air quality regulatory requirements are met. This is done through inspections and enforcement actions. ATLAS is responsible for the enforcement of federal and state regulations for preconstruction asbestos removal and a number of outreach and enforcement programs designed to reduce exposure to lead-based paint. Through the *Small*

Business Environmental Assistance Program (SBEAP), the Compliance Branch also assists small businesses in complying with state and federal regulations, including New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), New Source Review (NSR), and Utah's air quality rules. The SBEAP can advise small businesses on permitting requirements, emission calculations, technical issues, and pollution prevention techniques.

The *Permitting Branch* is responsible for issuing construction and operating permits to stationary sources that emit air pollutants, and is comprised of three sections: *Minor Source NSR*, *Major Source NSR*, and *Operating Permits*. Construction permits are issued to new or modified stationary sources of air pollution through the NSR program. Operating permits are issued on an ongoing basis through Title V of the CAA to "major" stationary sources.

Planning Branch

The *Planning Branch* is principally responsible for developing SIPs and administrative rules in order to ensure that Utah's ambient air meets the federal health standards, even as our population and our economy continue to grow. These plans address a variety of air quality issues, but most often focus on areas of the state where the monitoring identifies air quality that is unhealthy for one or more of the criteria pollutants. In addition to developing plans and rules, the Planning Branch is actively engaged in acquiring the funding for and administering and managing many projects and initiatives that are aimed at improving air quality throughout the State.

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Status of Projects and Initiatives

Air Quality Research Projects

Legislative funding for air quality research has provided DAQ with the resources to investigate the complex conditions that lead to high pollution levels during winter inversions and summer ozone episodes. Better understanding of the unique conditions that lead to poor air quality helps DAQ craft effective regulations, target emission sources, and apply appropriate emission-control technologies. In addition, this state funding is critically important for leveraging federal, state, private-sector sponsorships, and in-kind support for research initiatives.

In 2018, the Utah Legislature approved $500,000 in ongoing funding for air-quality research through the Science for Solutions Research Grant. This annual research funding will help DAQ improve its knowledge of the unique atmospheric and chemical conditions that contribute to air pollution in Utah.

For detailed information about DAQ's applied air quality research projects, please visit our website at: aqresearch.utah.gov

Current Research Projects (FY 2021)

Five air-quality research projects were funded for fiscal year (FY) 2021 by the state legislature through the Science for Solutions Research Grant:

Emissions of Reactive Organics from Natural Gas-Fueled Engines

Utah State University scientists will improve estimates of the magnitude and composition of emissions from natural gas-fueled artificial lift engines used for oil extraction in the Uinta Basin. Recent ambient air measurements have implicated natural gas-fueled engines as a large source of reactive organics, including formaldehyde, ethylene, propylene, and other compounds. The results from this project will allow DAQ to better understand and model this source of ozone-forming pollution in the Uinta Basin and develop science-based, effective emissions reduction strategies for wintertime ozone.

Vertical Ozone Profiles in the Uinta Basin and Validating Drones as an Air Measurement Platform

The University of Utah will conduct vertical ozone profile measurements from ground level to the mid-stratosphere to develop a better understanding of ozone layers and evolution over Utah. Data collected by drones and balloons will provide information on the vertical distribution of ozone and nitrous dioxide (NO_2) among other gases. This data will be used by DAQ to inform policy and decision makers.

Quantitative Attribution of Wildfires on Summertime Ozone Concentrations along the Wasatch Front

Wildfires can significantly enhance summertime ozone and aerosol concentrations, which can degrade air quality and have adverse effects on human health. While air quality has improved across much of the U.S., the Western U.S. has seen a recent increase in wildfire activity. This project will assess the contribution of regional fires and long-range smoke transport to poor air quality in the Salt Lake Valley. This study will also improve our understanding of how wildfires interact with urban plumes, improve air quality modeling capabilities, and guide the implementation of effective regulatory policies.

Halogen Sources and their Influence on Winter Air Pollution in the Great Salt Lake Basin

The Great Salt Lake Basin is meteorologically and chemically distinct from other regions in the U.S. It is subject to both persistent cold air pools in complex terrain that lead to winter air pollution and potentially large inputs of natural and anthropogenic sources of halogen species. This project will investigate the role of these halogen sources in regulating the severity of winter fine particulate matter ($PM_{2.5}$). Results from this study will improve estimates of halogen emissions and enhance Utah DAQ's understanding of winter $PM_{2.5}$ chemistry.

Winter Measurements of Heavy-duty Vehicles to Characterize the Cold Temperature Effectiveness of Selective Catalytic Reductions Catalyst in Controlling Oxide of Nitrogen Emissions

The Salt Lake City region in Utah experiences periods of high particulate levels in the winter months due to the combination of its topography, winter atmospheric inversions and local emissions. Secondary nitrate particles comprise the dominant fraction of the particles in these episodes and are the result of the reaction of oxides of nitrogen (NO_X) with ammonia. A significant fraction of NO_X emissions in the Salt Lake City area are produced by heavy-duty vehicles operating in or traveling through the area on the interstate highway system. This study will measure wintertime NOx emissions from local heavy-duty vehicle activity in order to improve Utah DAQ emissions inventory estimates and better inform policy.

Goals and Priorities (FY 2022)

DAQ has recently sent out a Request for Proposals (RFP) for soliciting new applied air quality research projects. In order to meet Utah's upcoming regulatory challenges, DAQ will look to fund air quality research projects that prioritize one or more of the following seven goals:

Source Contributions to Summer-Time Ozone

The Wasatch Front often experiences exceedances of the national ambient air quality standard for ozone during the summer. Regulating locally-formed ozone to reach attainment is complicated by the fact that ozone has a mix of different sources. These include stratospheric transport, wildfires, biogenic emissions as well as international and US anthropogenic sources. To help establish control regulations, more measurements are needed to determine the contributions from these sources to high summer-time surface ozone.

$PM_{2.5}$ Formation and Precursor Gases

To better inform air pollution control strategies in northern Utah, it is necessary to understand the complex chemical processes that contribute to secondary $PM_{2.5}$ formation. Secondary $PM_{2.5}$ accounts for over 70% of total $PM_{2.5}$ during wintertime air pollution episodes. It is produced from complex atmospheric chemistry that involves several different gaseous compounds. UDAQ would like to better understand and quantify the sources of compounds contributing to wintertime air pollution along the Wasatch Front and Cache Valley. Information on their spatial, temporal and vertical distribution as well as photolysis rates is also needed.

Physico-Chemical PM Composition

Supermicron particles, such as dust and chloride salts, can serve as area sources of halogens and condensational sinks for gas-phase nitric acid (HNO_3) thereby controlling the formation of secondary $PM_{2.5}$ when present in sufficient mass loading. To better understand the role that these fine and coarse-mode aerosols play in wintertime $PM_{2.5}$ atmospheric chemistry, more information is needed on size-resolved PM chemical composition, mass loading, and gas-particle partitioning.

Emissions Inventory Improvements

Recent studies along the Wasatch Front and Uinta Basin highlighted discrepancies between inventory estimates and measurements of several key precursors to the formation of ozone and $PM_{2.5}$. These include carbonyls, hydrocarbons, alcohols, halogens and ammonia, among others. Reconciling differences between inventory estimates and observations is needed for improved modeling of ozone and $PM_{2.5}$. Improved representation of emission sources and their estimated activity, spatio-temporal distribution and chemical speciation is particularly needed.

Air Exchange Processes and Pollutants Mass Transport

Air mass exchanges are important meteorological processes affecting the transport of air pollutants. Air exchanges across the Great Salt Lake, different Utah valleys, and canyons as well as between the polluted boundary layer and free troposphere affect the transport and mixing of key precursors to $PM_{2.5}$ and ozone. Regional meteorological processes also lead to long-range transport of ozone and its precursors. A more detailed characterization of these processes and their impact on air pollutants chemistry is needed. Better estimates of the mass transport of air pollutants, such as halogens and ammonia, are also needed.

Air Quality and Meteorological Model Improvements

Air quality models remain important tools for guiding policy makers in preparing State Implementation Plans to demonstrate compliance with federal air quality standards. Modeling enables UDAQ to demonstrate and quantify the effectiveness of future emissions control strategies. Better representation of the complex meteorological features, chemical mechanisms and physical processes associated with wintertime and summertime air pollution episodes is needed.

Toxic Urban Air Pollutants

Davis County has a large industrial complex with multiple oil refineries, chemical facilities and manufacturing industries. Given their close proximity to these sources, communities in this area are at high risk of exposure to air toxics. Identifying sources of these toxic pollutants is essential to reduce their emissions and associated risks. Compounds of particular interest include dichloromethane and formaldehyde. While previous source apportionment studies provided insight on emission sources of these air toxics in the Bountiful area, near-source monitoring is needed for better source identification.

General Updates

PM_{10} Redesignation

In 1987, the EPA defined a size "indicator" of the suspended particles that were of concern to public health. These were "fine" particles with an aerodynamic diameter of ten microns or less, and this regulated subset of total suspended particles was called PM_{10}. Both Salt Lake and Utah Counties were out of compliance with the EPA's new 24-hour health standard for PM_{10}. In 1991, the Board developed a SIP for each area. Both SIPs were successful, and by 1996 both areas were found to be attaining the standard. Ogden City was designated as moderate nonattainment in 1995; however, a clean data determination was approved and SIP elements were suspended.

In 1997, the EPA replaced PM_{10} as the indicator of fine particulate matter with a sub-set of particles having an aerodynamic diameter of only 2.5 microns or less. This would be known as $PM_{2.5}$. Both PM_{10} and $PM_{2.5}$ include a complex mixture of extremely small particles and liquid droplets. These particles can be emitted directly, as in smoke from a fire. Such particles are referred to as "primary" particulate. The particles can also form in the atmosphere when "precursor" gases such as SO_2, NO_x, VOCs, and ammonia undergo complex chemical reactions. The particles that form during these chemical reactions are referred to as secondary particulate. Secondary particulate is prominent during Utah's winter inversions.

The PM_{10} standard for controlling fine particulate is less restrictive than the $PM_{2.5}$ standard in Utah. However, the DAQ spent considerable effort developing what are called Maintenance Plans for Utah's three PM_{10} nonattainment areas. These areas include the Salt Lake County, Utah County, and Ogden City nonattainment areas (see Figure 2). The plans use air modeling to demonstrate at least ten years of continued compliance with the PM_{10} health standard.

No additional emission controls were needed to demonstrate the ten years of compliance. Certainly though, the emission controls recently adopted by the Board to address $PM_{2.5}$ will have a positive effect on PM_{10} levels. The maintenance plans were submitted to EPA in 2016 and on March 27, 2020, the EPA redesignated the three former nonattainment areas to attainment status. The areas are now in the first of two 10-year maintenance periods.

Reclassification of Utah's $PM_{2.5}$ Nonattainment Areas

With the $PM_{2.5}$ NAAQS lowered in 2006, Salt Lake City, Provo, and Logan areas were classified as moderate nonattainment. Moderate SIPs were submitted to EPA; however, Salt Lake City and Provo failed to attain the 24-hour standard (35 $\mu g/m^3$) as of the statutory attainment date of December 31, 2015. As a result, EPA reclassified these areas from moderate nonattainment areas to aerious nonattainment areas. Action to reclassify these areas was not unexpected. In fact, the moderate area SIPs for the Salt Lake City and Provo nonattainment areas demonstrated that it would be impracticable to attain by the statutory attainment date. The plan for the Logan nonattainment area did predict attainment by 2015. The EPA granted two one-year extensions to the moderate area attainment date for the Logan nonattainment area, extending the attainment date to December 31, 2017. The Logan nonattainment area did attain the standard by December 31, 2017. EPA proposal for redesignation of the Logan nonattainment areas is expected in early 2021.

Reclassification to serious nonattainment required Utah to revise its implementation plans. The serious area SIP amendments reach beyond the level of emission controls determined to be "reasonably available" which were included in Utah's moderate area SIPs, and achieve a level defined as the "best available." The additional controls implemented through the serious SIP, coupled with favorable meteorology brought the areas into attainment of the standard by the attainment date of December 31, 2019.

Attainment of the standard does not mean the area is reclassified to attainment status. The EPA must act to redesignate an area from nonattainment to attainment status. The CAA outlines five requirements that a nonattainment area must satisfy for redesignation to occur.

1. Attainment of the Standard
2. Fully Approved Attainment SIP
3. Improvement in Air Quality is due to Permanent and Enforceable Emissions Reductions
4. The State has met requirements applicable to the area under CAA Section 110 and part D
5. Fully Approved Maintenance Plan

All regulatory requirements for redesignation have been met for all three areas, with the maintenance plan being the core requirement for redesignating areas to attainment. The plans demonstrate continued attainment of the standard through 2035 with an intermediate year check in 2026. Eight years after redesignation, UDAQ is required to submit a maintenance plan revision demonstrating attainment for the second 10-year maintenance period.

EPA has proposed that the Salt Lake and Provo nonattainment areas be redesignated to attainment status. The final rule is expected to be published in the Federal Register in early 2021. The Logan nonattainment areas will likely be proposed for redesignation to attainment in early 2021 as well.

Wasatch Front Ozone

When EPA developed the first NAAQS for ozone in 1979, Salt Lake and Davis counties designated as nonattainment areas for that 1-hour standard. Following that first designation, both Salt Lake and Davis counties met the standard and were redesignated to attainment. Since 1979, the EPA changed the ozone NAAQS in 1997, 2008, and 2015. All areas of Utah met the 1997 and 2008 standards.

With a change in the ozone NAAQS in 2015, the EPA designated three nonattainment areas in Utah. Two of the nonattainment areas are on the Wasatch Front: one in Utah County and another that includes Salt

Lake, Davis, and parts of Weber and Tooele counties. The official nonattainment designations occurred in 2018.

In partnership with local universities and the EPA, several local studies have helped staff better understand ozone formation and transport along the Wasatch Front. Some of the studies' conclusions are:

- Ozone formation is associated with clear, sunny summer days with little wind.
- On a seasonal basis, the Wasatch Front experiences some transport of ozone and its precursors from upwind states and international sources, although the impact of that transport during high ozone periods is still being analyzed.
- The Great Salt Lake and diurnal wind patterns contribute to ozone formation.
- Vehicles are the largest source of NO_x.
- A large portion of VOCs come from biogenics (natural sources such as plants).
- Elevated ozone coincided with elevated levels of VOCs and NO_x, which are the primary chemical precursors of ozone formation.

Based on monitoring data from 2018, 2019, and preliminary data from 2020, Utah County is currently attaining the standard. Ozone monitors along the Wasatch Front continue to show exceedances of the current ozone NAAQS in Weber, Davis, Tooele, and Salt Lake counties. These counties are likely to be reclassified from marginal to moderate nonattainment status after August 2021. DAQ has already begun planning efforts for the required moderate area SIP, including creating a detailed inventory of emissions from the nonattainment area. DAQ is looking into the feasibility of an international transport demonstration as a means to account for the impact of international emissions on Utah's ability to attain the ozone standard on the Wasatch Front. It is unclear whether the Wasatch Front is unduly impacted by international emissions on days that the state exceeds the standard. Regardless of the impact, DAQ is committed to doing what it can to attain the ozone standard.

Uinta Basin Ozone

The EPA and DAQ have been monitoring ozone levels in the Uinta Basin (Basin) since about 2009 and have been working towards greater understanding of the wintertime ozone phenomenon since first observing the elevated levels. Several years of study have established the following thoughts on ozone formation in the Basin:

- Ozone formation is associated with stable meteorological conditions, snow cover, and sunshine.
- NO_x comes from hot combustion sources, and the highest levels are in the oil production areas and population centers.
- VOC comes from oil and gas production with the highest levels in the gas production areas.
- There is high year-to-year variation in ozone levels due to variation in meteorological conditions, principally snow cover.
- Elevated ozone coincided with elevated levels of VOCs and NO_x, which are the primary chemical precursors of ozone formation.
- Complex patterns of light winds within the Basin appear to produce an east-west "sloshing" of air that contributes to intra-basin mixing of ozone and ozone precursors.
- Chemical reactions during these winter episodes differ greatly from summer ozone formation in urban areas.
- Aromatic VOCs such as toluene and xylene contribute in secondary formation of wintertime ozone pollution in the Basin; therefore, VOC control measures focused on these types of VOCs will be particularly effective.
- Formaldehyde (HCHO) and other aldehydes are the dominant radical sources needed for ozone formation and are important chemical species to control.

Research funding was used for an aerial helicopter study of oil and gas sources on both Indian and state lands combined with ground observations in the winter/spring of 2018. This was a cooperative study between the Ute Tribe, BLM, UDAQ, and EPA and provided further understanding of where potential emissions from oil and gas production equipment can originate. Unfortunately, the cold winter and snow resulted in less than optimal results. A study into the composition of VOC emissions from oil and gas wells in the Basin began in the fall of 2018 and sampling went into 2019. A thorough evaluation of the results of this study by a technical team of EPA and UDAQ staff, with coordination with the Ute Tribe, led to revised emissions factors for oil and gas sources and an update to the 2017 Uinta Basin Oil and Gas Emission Inventory (UBOGEI). This provides a more accurate data set for use in upcoming photochemical modeling and development of control strategies to help bring the Basin into attainment with the 2015 ozone standard. Additionally, through permitting requirements and sampling requests by EPA, a large number of samples from produced water disposal ponds have been collected and provided a larger, technically valid data set to also update the value estimated in the 2017 UBOGEI. This update added a significant increase in total annual VOC's for the Basin.

An EPA sponsored targeted airshed grant was awarded to DAQ in 2019 that would help fund the replacement of older natural gas engines that support oil and gas operations in the Basin with newer, cleaner natural gas engines. There are large amounts of older engines in the Basin which, even though they are smaller in horsepower (25 to 100 HP), emit significant emissions of VOCs in the airshed. This replacement program was funded at 5 million dollars. Unfortunately, no one has applied for this grant in 2020 potentially due to the decrease in production and economic impact of the COVID-19 pandemic. However, the feedback from operators also indicated that to replace these engines with newer, larger engines is not practical as the power needed is so small that those engines would be too much for the facility. DAQ is working with EPA and operators on other options that would work within the requirements of the grant.

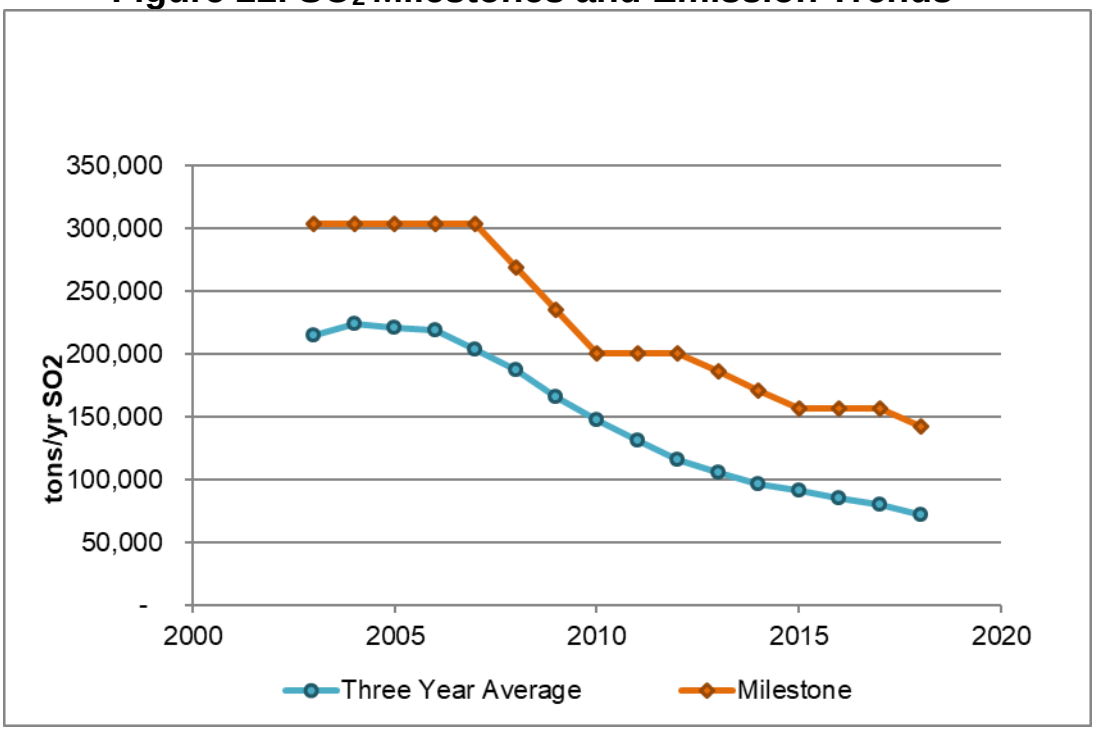
On August 3, 2018, the EPA designated the Uinta Basin as an ozone nonattainment area with a marginal classification. This will require attainment of the 2015 ozone standard by August 3, 2021. Unfortunately, several monitors in the Basin measured high levels of ozone during a strong inversion in February 2019. These monitored levels indicate that it will almost be impossible for the Basin to attain the ozone standard by 2021. Therefore, the DAQ, EPA, and Ute Tribe are beginning to plan for the likely bump up in nonattainment classification from marginal to moderate. This bump up would most likely occur around February of 2022 with a moderate SIP due in February of 2023. The moderate SIP will require additional controls and a modeled attainment demonstration of the standard by August of 2024. The understanding of the emissions and sources of the ozone precursors VOCs and NOx will be the stepping stones to control strategies and future regulations included in the SIP. Information gathered from the 2017 oil and gas emission inventory will be vital to understanding emissions that contribute to ozone formation in the Basin.

There were no ozone exceedances monitored in the Basin in 2020 and as such the Basin will be eligible for requesting a one-year extension on the current attainment date of August 3, 2021. However, the data still indicates that the Basin will not attain by August 3, 2022. If there are no exceedances in 2021, there would be the option of a second-year extension and the possibility of attainment by August 3, 2023. In the meantime, UDAQ continues to plan for the potential bump up to a moderate classification and the need for a SIP. Planning includes contacting sources that will need to implement Reasonably Available Control Technology (RACT) requirements, and preparing projected and episodic inventories to support the development of a working photochemical model for the Basin.

Regional Haze SIP

Utah's Regional Haze Plan includes regional targets for SO_2 emissions, with a backstop-trading program to ensure that the emission reduction goals are achieved. Each year, the states participating in the program compile an inventory of SO_2 emissions and then compare the emissions to the milestones established in the plan. The regional emissions for 2018 were 71,994 tons, 51% below the milestone. The emissions are far below the milestone due to the early installation of emission controls at power plants and other emission sources. The region has been well below the milestone every year of the Regional Haze program as shown below. Though 2018 was the final milestone for this program, it is still a requirement in the SIP. Therefore, Utah and the other participating states will continue to submit an annual SO_2 report.

Figure 22. SO_2 Milestones and Emission Trends



The Regional Haze Plan also includes a section addressing long-term strategies for reducing haze-causing emissions from stationary sources. In 2015, the Board approved an updated version of the stationary sources section called Alternative to BART (Best Available Retrofit Technology) that had been developed in close cooperation with staff and management from EPA Region 8. After a long review period, the EPA headquarters decided to disapprove portions of the plan and issue a Federal Implementation Plan (FIP) in its place. The Utah Attorney General's Office, PacifiCorp, and other entities challenged the disapproval in court. EPA recently reconsidered the decision. EPA approved the final portion of Utah's Regional Haze SIP for the first planning period on November 27, 2020. With the approval, EPA also found "that Utah's SIP fully satisfies the requirements of section 309 of the Regional Haze Rule and therefore the State has fully complied with the requirements for reasonable progress, including BART, for the first implementation period.

The SIP for the second Regional Haze Planning Period (2021-2028) is due July 2021. The DAQ is working with western states through the Western Regional Air Partnership to complete the technical work required for this SIP. The DAQ is working with various sources to determine what emission controls may be necessary to achieve reasonable progress during this second planning period.

Air Quality Incentive Programs

The DAQ administers several incentive programs created to encourage individuals and businesses to voluntarily reduce emissions. Funding for these programs comes from various sources, including settlement agreements, legislative appropriations, and federal grant programs. The following sections provide a summary of each program. More information on these programs is available online at airincentives.utah.gov.

Targeted Air Shed Grants

Through congressional appropriations, EPA provides funding opportunities to the top five most polluted nonattainment areas for ozone, annual $PM_{2.5}$, or 24-hour $PM_{2.5}$ standards through competitive grants, also known as Targeted Air Shed grants. Successful recipients use the funding to reduce air pollution in their nonattainment areas. UDEQ was a recipient of these funds in 2016, 2017, and 2018 for targeting emissions in the state's three nonattainment areas for the 24-hour $PM_{2.5}$ standards: Logan, Salt Lake, and Provo and the Uinta Basin nonattainment area for wintertime ozone.

School Bus Replacements

School buses were part of the focus in 2016 for the Logan and Provo nonattainment areas. UDEQ received $2,477,250 for 35 diesel school bus replacements in the Cache County/Logan City School District and 10 diesel school bus replacements in the Provo School District. In 2017, $3,184,875 was awarded to UDEQ for heavy-duty diesel truck replacements in the Logan, UT, nonattainment area. Cache County and Hyrum, Logan, Nibley, and North Logan cities will replace 16 heavy-duty diesel trucks with this funding, with over $1,090,000 still available for new projects.

The school bus replacement projects are estimated to reduce emissions by nearly 70 tons per year and over 1,942 over the lifetime of the projects. The heavy-duty diesel truck replacement projects are estimated to reduce emissions over 94 tons per year and over 1,790 tons over the lifetime of the projects.

Vehicle Repair and Replacement Assistance Program

In March of 2017, EPA awarded $2,477,250 to DEQ for the Logan, Utah-Idaho Nonattainment Area and in September of 2019, EPA awarded $4,698,489 to DEQ for the Salt Lake City, Utah Nonattainment Area. Money from these grants fund a vehicle repair and replacement assistance program (VRRAP). An individual whose vehicle does not pass an emissions test may receive financial assistance from the VRAAP to replace the failed vehicle with a newer, cleaner one or to repair it so that it passes a subsequent emissions test. The amount of financial assistance depends on household income, household size, and whether the applicant chooses to replace or repair the failed vehicle. Financial assistance can be as high as $5,000 for a vehicle replacement or $1,000 for a repair. The program is administered by the Bear River Health Department in the Logan, UT-ID Nonattainment Area, with the Davis, Salt Lake, and Weber-Morgan Health Departments administering the program in the Salt Lake City, UT Nonattainment Area.

The Salt Lake City VRRAP had planned to start Spring/Summer 2020; however, COVID has delayed program implementation until 2021. The Logan VRRAP officially opened for the public on April 20, 2017. As of September 30, 2020, the VRRAP has repaired 824 and replaced 189 vehicles. These activities are anticipated to reduce emissions annually by 8.12 tons of NMOG, NO_x, and PM and reduce lifetime emissions of NMOG, NO_x, and PM by 59.40 tons.

Uinta Basin Non-Road Engine Replacement Assistance Program

In October 2019, EPA awarded DEQ a Targeted Air Shed Grant of $5 million to administer an incentive program called the Uinta Basin Non-road Engine Replacement Assistance Program. The Program aimed to provide financial assistance of up to 40% of the cost to replace pre-2008, non-road, natural gas engines supporting oil and gas production with newer, cleaner engines. DEQ intended to work and partner with the Ute Tribe and oil and gas producers to reach out to all potential applicants and eligible energy production equipment. However, the future of the $5 million Uinta Basin TAG is uncertain. Unfortunately, DEQ has not been able to garner interest in oil and gas producers investing in natural gas engine upgrades. We believe this is mainly because many producers would have to purchase larger-powered engines in order to comply with our current rules. Doing so would significantly over-power their sites which is understandably unappealing to them. An amendment to this grant is likely. Alternative projects are being explored and their viability evaluated. DEQ remains in communication with EPA to discuss the amendment process and project suitability.

Wood Stove Conversion Program

The DAQ's wood stove and fireplace conversion program helps residents, particularly low-income households, reduce their emissions from burning wood by providing financial assistance to convert their wood burning devices to cleaner-burning devices. Residents in Utah's $PM_{2.5}$ nonattainment areas are eligible to participate. The conversion program plays an important role in reducing emissions as one wood stove is shown to emit as much as 100% more than its gas-powered counterpart. Although monitoring data shows that all three nonattainment areas have attained the 24-hour $PM_{2.5}$ NAAQS, wood-burning remains a major contributor to particulate pollution. Woodstove conversions will help ensure the areas continue to attain the standard in the future.

The wood stove and fireplace conversion program started in December 2017 after the EPA awarded Utah just over $9.5 million through a competitive Targeted Airshed Grant. Originally scheduled as a five-year program, demand has outpaced funding, and the grant funds will be spent well before the five-year mark. The Salt Lake City, Provo, and Logan nonattainment areas all received approximately $3.2 million for conversions. Approximately 900 conversions have been completed in the Salt Lake area, and the Provo and Logan area projects will be completed in early 2021, with similar numbers. The emission reduction estimates will be calculated upon grant completion.

During the 2019 legislative session, the State Legislature identified the continued replacement of wood burning devices with cleaner-burning devices as a key strategy to continued improvement in air quality throughout the State. As a result, they allocated an additional $9 million to augment the wood stove and fireplace conversion program.

The program has gained overwhelming popularity with the public and participation response to the programs have exceeded all expectations. As of the end of December 2020, DAQ has completed over 3,039 projects with the combined funding. More information on the program, including eligibility requirements and registration dates, is available at stoves.utah.gov.

Electric Vehicle Supply Equipment (EVSE) Projects

Workplace Electric Vehicle Charging Funding Assistance Program

During the 2019 General Legislative Session, the State Legislature appropriated $4.9 million to incentivize the installation of electric vehicle supply equipment (EVSE) throughout the State. The EVSE incentive program allows businesses, non-profit organizations, and other governmental entities (excluding State Executive Branch agencies) to apply for a grant for reimbursement of up to 50% of the purchase and installation costs for a pre-approved EVSE project. Funds can be used for the purchase and installation of both Level 2 or DC fast charging EVSE.

The program began to accept applications on September 16, 2019. As of December 9, 2020, 12 projects totaling just over $350,000 have been completed, with 75 Level 2 and nine DC fast EVSE installed throughout the State. DAQ has pre-approved an additional 29 projects encumbering approximately $775,000 of the available funds.

Volkswagen (VW) EVSE

As a result of the VW settlement described in the section below, the DAQ has awarded over $3.8 million to 18 government entities to install 96 level 2 and 26 DC fast chargers throughout Utah. As of December 14, 2020, 46 Level 2 and 11 DC fast chargers have been installed. More details on the VW Settlement and the VW EVSE program are provided in the section below.

Volkswagen (VW) Settlement

In 2015, the United States (U.S.) Environmental Protection Agency (EPA) issued two notices of violation of the CAA to Volkswagen Group[3] (Volkswagen or VW), the German automotive manufacturer. The EPA asserted that VW installed software that activated emissions controls only while undergoing emissions testing, but rendered certain emissions controls inoperative during normal driving conditions. Consequently, approximately 500,000 2.0-liter diesel vehicles (models 2009 to 2015) and 90,000 3.0-liter diesel vehicles (models 2009-2016) sold across the U.S. emitted between 9 and 40 times the nitrogen oxides (NO_x) emissions allowed by federal law[4].

Utah received approximately $35 million from a nationwide settlement with VW for violations of the CAA. Utah's portion will help offset excess nitrogen oxides (NO_x) emissions from the approximately 7,000 VW, Audi, and Porsche vehicles in the state affected by the automaker's violations.

The DAQ estimates that these excess NO_x emissions contributed between 351 to 1,556 tons of NO_x over the span of time they were operating in Utah. Approximately 70 percent of the affected vehicles were registered in the seven counties designated as nonattainment for particulate matter ($PM_{2.5}$) under the National Ambient Air Quality Standards.

Governor Herbert designated the DEQ as the lead agency to administer these monies. DEQ's responsibilities as lead agency include the development of an Environmental Mitigation Plan (EMP). On behalf of the DEQ, the DAQ oversaw this process and invited the public to provide input on the EMP and worked with an advisory committee on recommendations.

The VW settlement included a prescribed list of categories for NO_x mitigation projects. DAQ crafted an EMP using these guidelines, input from the public, and recommendations from an advisory committee. Final selection of Eligible Mitigation Action (EMA) categories was based on the advisory committee's recommendations, public input, and DAQ goals:

- To achieve significant NO_x reductions that work toward fully mitigating the excess lifetime NO_x emissions from the non-compliant VW vehicles and contribute to the State's ongoing goal of reaching attainment of the NAAQS.
- To maximize the amount of emissions reductions for each dollar spent.
- To benefit areas in Utah that bear a disproportionate amount of the air pollution burden.
- To stimulate emerging vehicle technologies that result in long-term emissions benefits.
- To provide economic and health benefits to the citizens of Utah.

The plan focuses the $35 million settlement funds on upgrades to government-owned diesel truck and bus fleets as well as the expansion of electric-vehicle (EV) charging equipment. Funding allocations are as follows:

- Class 4-8 Local Freight Trucks and School Bus, Shuttle Bus, and Transit Bus: 73.5%
- Light-Duty, Zero Emissions Vehicle Supply Equipment: 11%
- Administrative Costs: 8.5%
- Diesel Emission Reduction Act (DERA) options: 7%

Applications for funding were available from October 1, 2018, to November 30, 2018. Government entities as defined in Utah Code § 63G-7-102(4) and federal government agencies were eligible to apply.

DAQ received 50 applications for the Class 4-8 Local Freight Trucks, School Bus, Shuttle Bus, and Transit Bus categories and 25 applications for the Light-Duty, Zero Emissions Vehicle Supply Equipment category with combined projects totaling over $71 million. Projects were prioritized and selected based on their reduction of nitrogen oxides (NO_x), cost-per-ton of NO_x reduced, value to the nonattainment areas and community benefits. Successful projects are shown in the subsequent tables. Awardees have three years to complete their projects. More information on the VW Settlement is available at vw.utah.gov.

[3] The Volkswagen Group collectively includes Volkswagen AG, Audi AG, Volkswagen Group of America, Inc., Porsche AG, and Porsche Cars North America, Inc. Notice of Violation from Phillip A. Brooks, EPA Air Enforcement Division to David Geanacopoulos and Stuart Johnson, Volkswagen Group of America, Inc. (September 18, 2015); Notice of Violation from Susan Shinkman, EPA Office of Civil Enforcement to David Geanacopoulos and Stuart Johnson, Volkswagen Group of America, Inc. and Joseph Folz and Walter J. Lewis, Porsche Cars North America, Inc. (November 2, 2015).

State of Utah VW Settlement Awards Class 4-8 Local Freight Truck, School Bus, Shuttle Bus and Transit Bus Categories			
Awardee	**Project Type**	**Award Amount**	**# of Vehicles Awarded**
Bountiful City	Diesel sanitation trucks replaced with new diesel trucks	$145,000	2
Canyons School District	Diesel school bus replacements to diesel	$826,000	14
Davis School District	Diesel school bus replacements to diesel	$136,260	2
Jordan School District	Diesel school bus replacements to diesel	$138,992	2
North Salt Lake City	Diesel freight truck replaced with new diesel trucks	$108,741	1
Orem City	Diesel dump trucks and fire trucks replaced with new diesel trucks and Diesel shuttle bus replacement to diesel	$1,070,000	5
Park City Municipal Corp	Diesel transit bus replacements to electric	$3,693,941	6
Pleasant Grove City	Diesel dump trucks replaced with new diesel	$410,112	5
Salt Lake City Corporation	Diesel maintenance trucks, utility trucks, and fire trucks replaced with new diesel trucks	$1,773,853	14
Salt Lake City School District	Diesel school bus replacements to electric	$699,660	4
Salt Lake Urban Search & Rescue	Diesel freight trucks replaced with new diesel trucks	$86,740	1
Tooele County School District	Diesel school bus replacements to diesel	$132,000	2
UDOT	Diesel snow plows replaced with new diesel snow plows	$2,604,948	22
Utah Transit Authority	Diesel transit bus replacements to electric	$13,079,240	20
	Totals	**$24,905,487**	**100**

Division of Air Quality –2020
Annual Report

State of Utah VW Settlement Awards Light-Duty Zero Emission Vehicle Supply Equipment Category (EVSE)						
Awardees	**Award Amount (based on vendor bids at time of application submittal - November, 2018)**	**EVSE Type Included in Project Proposal**	**Number of EVSEs Proposed in Project Proposal**	**Number of Actual EVSEs Installed by Project Completion**	**Reimbursement Amount for Completed Projects**	**Location of Project**
Clinton City	$60,129.00	Level 2	3	3	$46,808.38	**Location 1-** Civic Center Park **Location 2**- Center Park **Location 3 -**Powerline Park
Davis Technical College	$49,000.00	Level 2	4	4	$46,037.00	Davis Applied Technical College Campus
Utah Division of Facilities and Construction Management (DFCM)	$49,401.00	Level 2	11	12	$49,401.00	**Location 1-** Multi State Agency Office Building **Location 2-** Regional Building 2
Kamas City	$41,227.00	Level 2	1	Still in Process	Still in Process	City Office
Kaysville City	$69,988.00	Level 2	9	9	$69,572.00	**Location 1-** City Hall **Location 2**- 100 E. 200 N. Kaysville, UT **Location 3-** 300 North Flint St., Kaysville, UT **Location 4-** Kaysville Operations Center
Lehi City	$16,755.00	Level 2	1	1	$16,755.00	City Hall
Murray City Power	$157,608.00	Level 2	2	Still in Process	Still in Process	Murray Park Recreation Center
		DC Fast Chargers	1	Still in Process		
Orem City	$308,269.00	DC Fast Chargers	4	4	$270,675.00	City Hall
Provo City	$752,500.00	Level 2	20	Still in Process	Still in Process	**Location 1.** Provo City Center **Location 2**. Recreation Center (Parks & Rec) **Location 3**. Academy Library **Location 4**. Public Works Complex **Location 5**. Provo Power Complex **Location 6**. Rock Canyon Park **Location 7**. North Park **Location 8**. Spring Creek Park **Location 9**. Pioneer Park
Salt Lake County Health Department	$603,095.00	Level 2	8	Still in Process	Still in Process	The Salt Lake County Environmental Health Department
		DC Fast Chargers	2	Still in Process		
Sandy City	$118,982.00	DC Fast Chargers	3	3	$118,982.00	City Hall
Saratoga Springs	$26,788.00	Level 2	3	3	$26,788.00	Municipal Campus
South Salt Lake City	$136,517.00	Level 2	4	Still in Process	Still in Process	City Hall
Timpanogos Cave National Monument	$10,966.00	Level 2	1	Still in Process	Still in Process	Timpanogos Cave National Monument Visitor Center
Utah Department of Transportation (UDOT)	$1,047,623.00	Level 2	11	10 (Still in Process)	$204,401 (Still in Process)	**Location 1-**Calvin Rampton **Location 2**- Garden City **Location 3** Castle Dale City/Museum **Location 4-** Monticello Visitor Center **Location 5**- Bluff Maintenance Station **Location 6** Richfield Administrative Office **Location 7**- Kanab **Location 8**- The Fork Rest Area
		DC Fast Chargers	16	4 (Still in Process)		**Location 9**- Grassy Mountain Rest Area West and East Bound **Location 10-** UDOT Price District Office
Utah Valley University	$99,000.00	Level 2	6	4 (Still in Process)	$72,790 (Still in Process)	**Location 1**- Orem Main Campus **Location 2**- Business Resource Building **Location 3-** Auxiliary Service Building
Weber State University	$143,694.00	Level 2	8	Still in Process	Still in Process	**Location 1-** Campus Services Building **Location 2**- Hurst Center **Location 3**- Reed K. Swenson Building **Location 4** Dee Event Center
West Valley City	$140,564.00	Level 2	4	Still in Process	Still in Process	**Location 1-** City Hall **Location 2-** West Valley City Fitness Center
Total	**$3,832,106**	Level 2	96	46	**$645,018**	
		DC Fast Chargers	26	11		

Utah Clean Diesel Program

The Utah Clean Diesel Program aims to cut emissions from heavy- duty diesel vehicles and equipment that operate in the State's nonattainment areas. In 2020, the EPA awarded the Utah Clean Diesel Program $2.64 million to replace diesel refuse haulers, short-haul delivery trucks, and school buses with newer, cleaner versions. Fleet owners receive a 25 percent incentive toward the purchase of new vehicles and equipment that meet the cleanest emissions standards.

Retiring engine model years 2006 and older diesel trucks that are currently operational and have a minimum of three years remaining in their useful life and replacing them with current model years can achieve approximately 71 to 90 percent reductions in NO_x, 97 to 98 percent reductions in $PM_{2.5}$, and 89 to 91 percent reductions in VOCs, according to the EPA Emissions Standards for Heavy-Duty Highway Engines and Vehicles.

EPA provides a separate allocation of clean diesel funding for participating states, known as the State Clean Diesel Grant program, that UDEQ will use to offer $760,967 for the replacement of diesel school buses to all-electric school buses and another $979,814 for the replacement of diesel non-road vehicles, refuse trucks, Class 8 trucks, and school buses. VW Settlement funding of $1,217,300 will provide added funds for this project for a total of $2,958,081. DAQ is currently partnering with Salt Lake City School district who will be awarded $875,00 to replace four diesel school buses with electric school buses through this program.

Nearly $24 million in federal grants have been awarded through the Utah Clean Diesel Program since 2008, resulting in thousands of tons reduced from diesel emissions.

2020 Division of Air Quality Electric Snow Blower Exchange

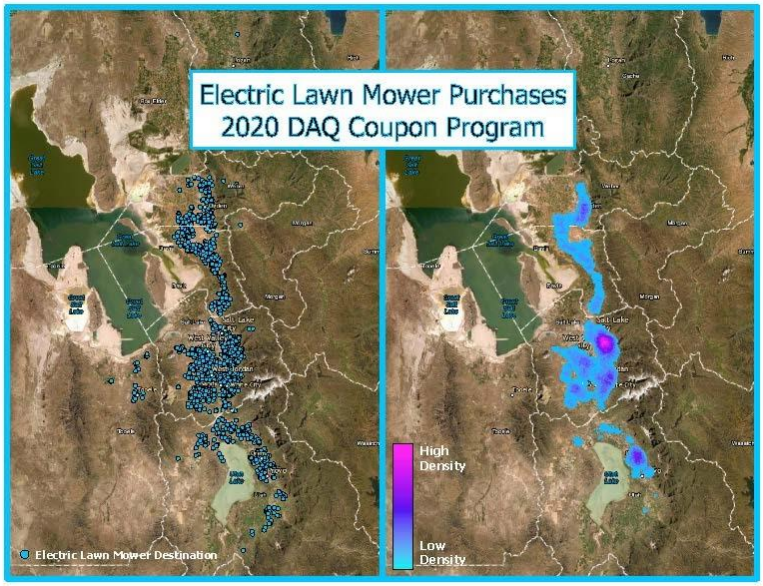
The 2020 Snow Blower Exchange was cancelled due to COVID-19 concerns. DAQ plans to bring the program back in Fall 2021.

2020 State of Utah Yard Equipment Exchange

The 2020 Yard Equipment Exchange was cancelled due to COVID-19 concerns. DAQ plans to bring the program back in Spring 2021.

2020 State of Utah Online Electric Lawn Mower Discount Program

DAQ partnered with Home Depot to offer 1,200 participants $150 coupons toward the purchase of an electric lawn mower of their choice, retailing at $299 or more. Coupons were valid exclusively at homedepot.com and not valid in-store. Residents of the $PM_{2.5}$ nonattainment area (Davis, Salt Lake, Weber, Tooele, and Utah Counties) were eligible to receive this coupon. Online registration opened Monday, April 6, 2020 on a first-come, first-served basis. 1,200 initial registrations were filled and a coupon code was emailed to each eligible participant. Only one coupon per household was allowed. Recycling a gas-powered lawn mower was not required as eligibility for this program. 636 coupons were used before they expired on June 15, 2020. A second registration period opened July 1, 2020, and offered an additional 600 $150 online coupons. 314 more coupons were claimed before they expired on July 6, 2020. A total of 950 electric lawn mowers were purchased across the Wasatch Front between the two rounds of the program. The map below shows all locations where the electric mowers will be used.



Free-Fare Day Pilot Project

During the 2019 Legislative Session, the Legislature appropriated $500,000 to the DAQ to administer a Trip Reduction Program. A primary component of the Trip Reduction Program is a Free-Fare Day Pilot Project. The DAQ has worked closely with the Utah Transit Authority (UTA) to provide free fares during inversion periods when pollution concentrations are increasing and projected to reach levels that are harmful to human health. The DAQ originally anticipated the provision of seven free fare days over the life of the program. However, due to ridership changes associated with the COVID-19 pandemic, the total number of free fare days will be determined based upon estimated foregone fare revenues and remaining available funding. As a result of favorable air quality conditions, no free fare days were implemented in 2020. At the end of the project, the DAQ will provide a report to the Legislature that analyzes the air quality benefits of the program. The UTA will provide much of the data necessary for the report, including ridership data and results from surveys administered on Free-Fare days.

Ancillary Programs

Transportation Conformity

Several Metropolitan Planning Organizations (MPOs) are responsible for developing, producing, and adopting Metropolitan (or Regional) Transportation Plans (MTP or RTP) and Transportation Improvement Programs (TIP) within the state. The MPOs include Cache MPO (CMPO), Dixie MPO, Mountainland Association of Governments (MAG), and the Wasatch Front Regional Council (WFRC). MPOs located in nonattainment and/or maintenance areas have the responsibility to ensure that the current MTP and TIP conform to the Utah SIP through a process known as transportation conformity. The Federal Highway Administration and Federal Transit Administration review the conformity determinations along with the MTP and TIP in consultation with the EPA to ensure that the relevant planning and air quality regulations have been adequately addressed. The Utah Department of Transportation (UDOT) is responsible for transportation conformity within isolated rural nonattainment areas when a non-exempt FHWA/FTA project(s) needs funding or approval.

CMPO, MAG, and WFRC demonstrated conformity to the SIP for the Plans and TIPs for their respective areas' established conformity for the 2050 RTP in June of 2019 and the 2019-2024 TIP in August 2018: Cache County, Utah portion of the $PM_{2.5}$ moderate nonattainment. MAG established conformity for the 2050 RTP in June 2019 and the 2021-2025 TIP in August 2020: Provo\Orem City CO maintenance area; Utah County PM_{10} and $PM_{2.5}$ moderate nonattainment area; Southern Wasatch Front, UT Ozone marginal nonattainment area (portion of Utah County).

WFRC established conformity for the 2021-2026 TIP in August 2019 and the 2050 RTP in May of 2019: Salt Lake City and Ogden City CO maintenance areas; Salt Lake County and Ogden City PM_{10} nonattainment areas; Salt Lake $PM_{2.5}$ moderate non-attainment area (Davis, Salt Lake, and Weber Counties and portions of Box Elder and Tooele Counties); Northern Wasatch Front, UT Ozone marginal nonattainment area (Davis, Salt Lake, and Weber Counties and portions of Box Elder and Tooele Counties);

UDOT was not required to establish conformity for the Uinta Basin, UT Ozone marginal nonattainment area (portions of Duchesne and Uinta Counties).

Utah Air Quality Public Notifications

The DAQ provides air quality forecasting on its webpage for the current and next two days. The Air Monitoring Section (AMS) provides air pollution information based on the daily air quality status. The AMS data is used to determine the relationship of existing pollutant concentrations to the NAAQS. There is a three-tiered air quality alert system: unrestricted, voluntary action and mandatory action. This system is used to implement winter and summer controls on the use of solid fuel burning devices, fire places, and motor vehicles, and to advise the public and industrial sources to act to reduce their pollution footprint during these events. The forecast call determines which restrictions are in place for a given county. In addition, the webpage advises the public as to current air quality conditions using the standard Air Quality Index (AQI) categories: good, moderate, unhealthy for sensitive groups, unhealthy and very unhealthy. Each advisory category listed on the webpage is accompanied by a health protection message that recommends actions affected groups can take to mitigate the effects of pollution on them and links to the AQI web site for further information. The AMS advisory is calculated for five major pollutants: ground-level ozone, particulate pollution (particulate matter), carbon monoxide, sulfur dioxide, and nitrogen

dioxide. The outreach program information consolidated in the three-day forecast includes the Summer and Winter Control Programs and Choose Clean Air information.

The DEQ is also sponsoring an electronic mail server (Listserv). Subscribers are automatically notified by e-mail when unhealthy air pollution levels are forecast throughout Utah and when action alerts are issued.

The National Center for Automotive Sciences and Technology at Weber State University developed a mobile app called Utah Air for the DAQ. It provides similar information directly on smart phones and other mobile devices. The application is free and can be downloaded from both the Android and Apple app stores. As of December 2020, the application has been downloaded onto over 100,000 mobile devices.

Choose Clean Air
DEQ continues to emphasize the Choose Clean Air program and has developed an interactive website containing information about ways individuals can help improve air quality by making smart choices in their personal lives. The website can be found at http://www.cleanair.utah.gov/.

Winter Control Program (unrestricted, voluntary action, mandatory action)
This program originated with the PM_{10} SIP, but was significantly strengthened in December 2012 to be much more proactive and less reactive. Now, instead of waiting until an area is exceeding a standard, action alerts are called when the DAQ meteorologists see that we are in the early building stages of an inversion that will likely lead to pollution concentrations at or above the trigger level of 25µg/m^3. The program runs annually from November through early March. In addition to the burning restrictions, residents are encouraged to drive less and are directed to information on other ways they can reduce pollution.

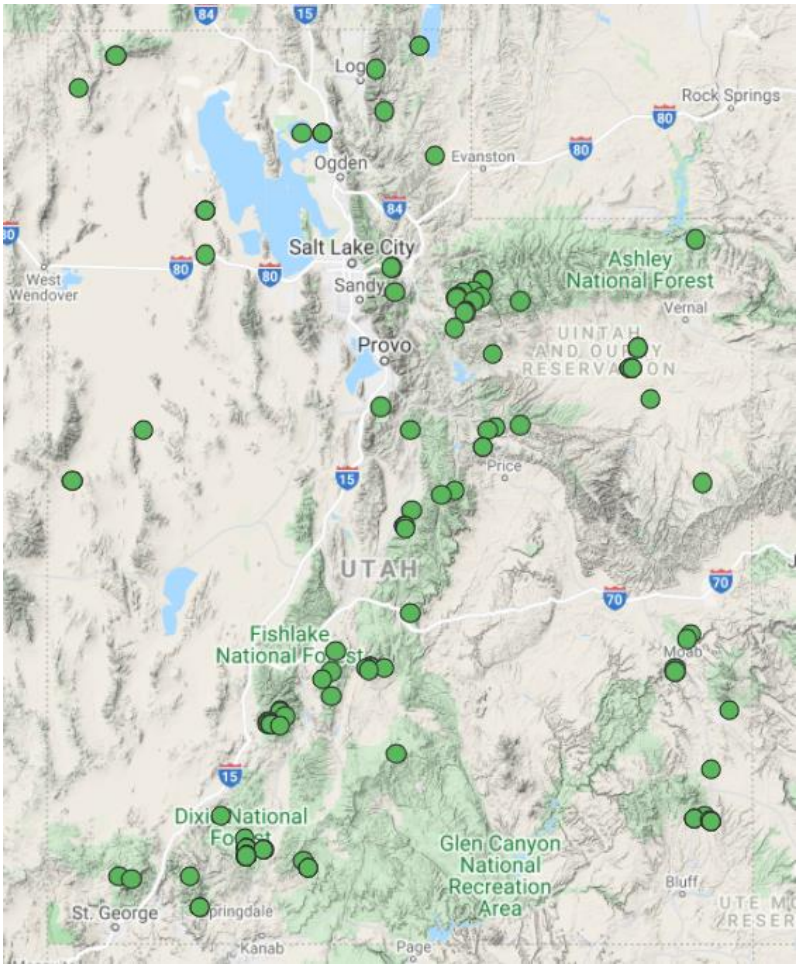
Summer Control Program (unrestricted, voluntary action, mandatory action)
Action days are announced whenever the probability of exceeding the ozone standard is forecasted to be high. High temperature and stagnant air masses contribute to this probability. Residents are encouraged to minimize driving whenever the ozone or PM standards are approached.

Smoke Management in Utah
Utah's first Smoke Management Plan (SMP) was written in 1999. The plan is designed to meet the requirements of Title R307, state administrative rule for air quality; Regional Haze Rule, 40 CFR 51.309(d)(6); and the policies of the EPA Interim Air Quality Policy on Wildland and Prescribed Fires. The signatories to the SMP are: US Forest Service, Bureau of Land Management, National Park Service, US Fish and Wildlife Service, Bureau of Indian Affairs, and the Utah Division of Forestry, Fire, and State Lands.

The SMP serves as an operational plan for the state administrative rule, R307-204 Emission Standards: Smoke Management, by providing direction and operating procedures for all organizations involved in the management of prescribed fire. R307-204 establishes by rule the procedures and the permitting process that land managers are required to follow to mitigate the impact of smoke on air quality and visibility in the State.

The following table provide a 5-year view of the numbers of permitted prescribed burns and acres burned across Utah.

Year	Acres Burned	Number of Prescribed Burn Projects
2016	16,757	225
2017	13,019	171
2018	12,802	188
2019	18,171	164
2020	5,636	120



Each green dot pictured in the figure above represents a prescribed fire in Utah in 2020.

Vehicle Inspection/Maintenance Programs

Inspection/Maintenance (I/M) programs were adopted in the early 1980s as a required strategy to attain the ozone and carbon monoxide NAAQS. These programs were very effective in improving air quality. They have played an important role in reducing emissions that contribute to ozone and carbon monoxide. Their continued operation is necessary for the Wasatch Front to remain in attainment of these standards. The county health departments administer these programs.

The most recent I/M program to be implemented in Utah is in Cache County. The program was fully implemented on January 1, 2014, and is running smoothly. In 2017, Weber County implemented a revised I/M program that includes diesel vehicles. For diesels less than 14,000 lbs. GVW manufactured between 1998 and 2006, they perform a visual inspection to verify the vehicle's emission controls have not been tampered with. For 2007 and newer vehicles, they perform a full On-Board Diagnostics test. Weber County Health Department has found that about 20% of the tested vehicles are failing. During the 2018 General Legislative Session HB 101 passed which created a pilot program requiring Utah County to require a diesel emissions inspection program. This program started on January 1, 2019 and continues until 2021.[1]

Smoking Vehicles

Vehicles emitting excessive smoke contribute to poor air quality. To promote clean air, several local health departments operate smoking vehicle education and notification programs. There were two bills passed during the 2015 General Legislative Session that helped enhance the smoking vehicle programs in the state:

- HB17 clarified that visible emissions from gas or certain diesel-powered vehicles are not allowed on Utah roads.
- HB110 gave the Utah Division of Motor Vehicles the authority to suspend a vehicle's registration if the vehicle does not meet air emissions standards.

The DAQ worked with the local health departments, Utah Division of Motor Vehicles, and Utah Highway Patrol to develop a method of enforcing these laws. People who spot a vehicle producing excessive smoke can report it through a statewide smoking vehicle hotline at 385- GOTSMOG(468-7664) or through their respective county health departments:

Cache County 435-792-6611
Davis County 801-546-8860
Salt Lake County 385-468-SMOG(7664)
Utah County 801-851-SMOG(7664)
Weber County 801-399-7140

Salt Lake County Health Department applied for and was awarded a grant to create a statewide smoking vehicle hotline. This program created a single number (385- GOTSMOG(468-7664)) to report vehicles that have visible emissions. They also created a webpage, utahsmokingvehicles.org, which includes the information needed to report a smoking vehicle as well as direct links to each respective county health department's smoking vehicle reporting webpage. Salt Lake County worked with the other local health departments to create and implement the program during 2018.

[1] See Utah Code Section 41-6a-1642 (6) and (7)

Compliance Branch

The Compliance Branch is comprised of three sections: Major Source Compliance, Minor Source Compliance, and the ATLAS. These sections are responsible for ensuring compliance with all air pollution orders, permits, rules, and standards. This is accomplished through inspections, audits of stack tests and continuous emission monitoring systems (CEMS), plan and report reviews, accreditation and certification programs, compliance assistance/outreach activities, and, when necessary, enforcement actions.

Major and Minor Source Compliance

The Major and Minor Source Compliance sections are responsible for ensuring compliance at more than 4,500 facilities within the state. The Major Source Compliance Section is responsible for inspections and report/plan reviews for the large facilities, audits of stack tests and continuous emission monitoring systems, and any associated enforcement. The Minor Source Compliance Section is responsible for inspections and report/plan reviews at small to medium-sized facilities, audits, stack tests, fugitive dust control, abrasive blasting, residential solid fuel burning, gasoline transport/filling station vapor recovery, open burning, and any associated enforcement.

Table 5 below summarizes the compliance activities of these two sections for 2020

Table 5. Major and Minor Source Compliance Summary

TASK	2020
Source Inspections	517
On-site Stack Test/CEM Audits	26
Stack Test/CEM Reviews	392
Emission Reports Reviewed	132
Temporary Relocations Accepted	63
Fugitive Dust Control Plans Accepted	1143
Soil Remediation Report Reviews	51
Open Burn Permit Application Completed Online	220
Miscellaneous Inspections	194
Complaints Received	171
Wood Burning Complaints	0
Breakdown Reports Received	12
Compliance Actions Resulting from a Breakdown	0
VOC Inspections	0
SCAN Warning Letters	17
Notices of Violation	3
Compliance Advisories	60
Settlements	32
Total Inspections	737
Penalties Assessed	**$201,051.60**

Air Toxics, Lead-Based Paint, and Asbestos Section (ATLAS)

ATLAS determines compliance with multiple regulations involving asbestos and lead-based paint (LBP). ATLAS is responsible for the following programs:

Lead-Based Paint

Toxic Substances Control Act (TSCA) Title IV, 40 CFR Part 745 and, Utah Administrative Code (UAC) R307-840, 841, and 842. Under this program, ATLAS performs regulatory oversite of training providers, regulated projects subject to the LBP Activities Rule and the LBP Renovation, Repair, and Painting Rule, certification of individuals and firms, and lead-based paint outreach activities.

Asbestos in Schools

TSCA Title II Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 and, UAC R307-801-4. Under this program, ATLAS deals with the review and approval of AHERA

Management Plans, performs inspections of buildings subject to AHERA, and inspections and asbestos abatement for structures subject to AHERA.

Asbestos NESHAP and State Asbestos Work Practices

40 CFR Part 61, Subpart M, UAC R307-214-1 and UAC R307-801. Under this program, ATLAS deals with the certification of individuals and companies, review of asbestos project notification forms, review of demolition notification forms, review of alternative work practice requests, inspection of asbestos abatement projects, demolition of structures, and asbestos outreach activities. ATLAS performed 472 total inspections.

Table 6. ATLAS Activity Summary

TASK	2020
Asbestos NESHAP Inspections	196
Asbestos AHERA (School) Inspections	215
Asbestos State Rules (Only) Inspections	32
Asbestos Notifications Accepted	1906
Asbestos Telephone Calls	4275
Asbestos Individuals Certifications	828
Asbestos Company Certifications	87
Asbestos Alternate Work Practices	51
Lead-Based Paint Inspections	29
Lead-Based Paint Abatement Notifications	10
Lead-Based Paint Telephone Calls	810
Lead-Based Paint Letters Prepared & Mailed	74
Lead-Based Paint Course Audit	3
Lead-Based Paint Individual Certifications	214
Lead-Based Paint Firm Certifications	107
Notices of Violations	1
Compliance Advisories	71
Warning Letters	40
Settlement Agreements	12
Penalties Collected	$41,901.90

Utah Asthma Task Force

The Utah Asthma Task Force is a multi-agency task force to address the problem of asthma in Utah. The task force meets quarterly and has a number of projects currently underway in addition to the programs initiated under the State Asthma Plan. The Division toxicologist, a member of the ATLAS team, is a founding member of the Task Force. The Division supports the Task Force in the preparation of public announcements and media communication relating to the risks of asthma symptoms associated with air pollution.

The goal of the DAQ for 2020 is to work with the Asthma Task Force to update the Utah Asthma Program web page http://health.utah.gov/asthma/ and clarify the two causal connections between adverse asthma effects and air pollution. Namely, the neuromuscular reflex that causes constriction of bronchi and upper respiratory airways characteristic of acute asthma attacks, and secondly, the exacerbation of chronic airway inflammation that makes asthma patients more susceptible to the full range of adverse health effects associated with exposure to air pollution.

Small Business Environmental Assistance 507 Program (SBEAP)

The CAA 507 Programs consist of three parts: A Small Business Ombudsman (SBO) to act as an advocate for small business, a Small Business Environmental Assistance Program (SBEAP) to provide technical support, and a Small Business Compliance Advisory Panel (CAP) to provide feedback and help identify small business issues. The SBEAP helps small businesses understand and comply with state environmental regulations including air quality rules. The SBEAP continues to assist small businesses by providing web resources, responses to email and telephone inquiries and assistance with permitting through a pre-design program. The Small Business CAP remains active with meetings scheduled quarterly.

Enforcement Actions

The following enforcement actions may be taken depending on the magnitude of the alleged violation(s), prior compliance history, and degree of cooperation of an alleged violator:

- Warning Letter—a notification sent to violators to resolve minor, and/or first-time violations.
- Early Settlement Agreement – a less formal administrative resolution of an alleged violation(s) in which the DAQ and the recipient agree in writing to specific actions taken to correct the alleged violation(s). Any stipulated penalties are discounted by 20% to encourage quick resolution. Supplemental Environmental Projects may be used to offset a portion of any cash payments for stipulated penalties. All collected penalties become part of the State General Fund.
- Notice of Violation and Order for Compliance – a formal, traditional declaration of a violation(s) which involves the Attorney General's Office. The cited violation(s) become final after 30-days, unless formal appeal procedures are followed.
- Settlement Agreement – a resolution of a Notice of Violation and Order for Compliance. The DAQ and the recipient agree to specific actions taken to correct the potential violation(s). No discounts of stipulated penalties are offered. The DAQ legal costs may also be collected. Supplemental Environmental Projects may be agreed to, to offset a portion of any cash payments for stipulated penalties. All collected penalties become part of the State General Fund.

Most enforcement actions are resolved through Warning Letters or Early Settlement Agreements. In rare instances, Notices of Violations and Orders for Compliance are used. In the extremely rare instance where the aforementioned enforcement actions fail to resolve a compliance issue, procedures are in place for Board hearings/administrative law judge review or formal judicial action. Environmental criminal cases are referred to the appropriate law enforcement agency.

Permitting Branch

The DAQ Permitting Branch is responsible for implementing state and federal air permitting programs that are intended to control air emissions from new and modified stationary sources that emit air pollutants. Permits are legally enforceable documents that specify the size and number of allowable emission units, operational limits of permitted emission units and emission limits for each permitted source. Permitted emission limits can be emission limitations (mass or concentration) or surrogate limits such as production rates, hours of operation, fuel consumption, or a combination thereof. Opacity, the measure of opaqueness or transparency of emission plumes, is also a common metric used to both limit and measure source emissions. Permits include testing and monitoring requirements. The results of the tests and the monitoring data are used to determine if a source of air pollution is operating in compliance with the permit and the rules.

The branch issues two types of permits. New Source Review (NSR) permits, also known as Approval Orders (AOs), are pre- construction-type permits for new and modified sources of air emissions. These are issued by the New Source Review Sections and have been required in Utah since 1969. An Operating Permits Section issues the Title V Operating Permits to the "major" stationary sources in the state, as required in Title V of the federal CAA. There are currently 77 of these sources. Operating permits consolidate all air quality related requirements from numerous state and federal air quality programs into a single regulatory document. The purpose of an operating permit is to clarify for the permit holder, as well as DAQ compliance inspectors, the wide range of requirements applicable to any regulated source by placing those requirements into one consolidated document.

In addition, the branch processes a number of smaller actions such as de minimus determinations for NSR, name changes, tax exemption certificates for pollution control equipment purchases, and soil aeration approvals.

New Source Review

Any new or modified source of air pollution in Utah is required to obtain an AO before it is allowed to begin construction. For areas that are not in compliance with the NAAQS, an NSR permit assures that air quality is not further degraded from the existing levels by new emission sources. In areas that are in compliance with the NAAQS, an NSR permit assures that new emissions do not significantly worsen air quality. These processes are outlined in both state and federal rules.

The application for an AO, called a notice of intent (NOI), is reviewed to make sure that the source installs appropriate state-of-the-art emission controls. For major sources in nonattainment areas, state-of-the-art technology is known as lowest achievable emissions rate (LAER). For areas in attainment of the NAAQS and for minor sources in nonattainment areas, state-of-the-art controls are known as the best available control technology (BACT). Both LAER and BACT are case-by-case determinations of control technology for a specific source. BACT considers the technical feasibility of implementing the control, the cost and the environmental benefits of the control equipment, while LAER technology considers only technological feasibility and environmental benefits.

The general public and the EPA are given an opportunity to review the proposed AO before it is issued. The Utah Air Quality Rules specify the criteria indicating which sources must obtain an AO. The New Source Review permitting program issued 97 permits during 2019. It took an average of 158 days to issue the permit from the submission of an application. Potential applicants are encouraged to contact the DAQ prior to submitting the necessary paperwork.

Operating Permits

Congress created Title V of the CAA in 1990. This Title requires states to issue an operating permit to the larger or "major" sources of air pollution within the state. Utah developed and submitted a program in 1994 and received approval from the EPA in 1995. Operating permits are legally enforceable documents issued to air pollution sources after the source has begun to operate. A primary purpose of the permit is to consolidate the applicable requirements from the many and varied air quality programs such as NSR permits, SIPs, federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP), and Maximum Available Control Technology (MACT). Like the AOs, the general public is given an opportunity to review the draft operating permits before they are issued. In addition, the EPA has up to 45 days to review the proposed operating permit. The criteria indicating which sources must obtain an operating permit are specified in R307-415 of the Utah Administrative Code (UAC). As with the NSR permit or AOs, potential applicants are encouraged to contact the DAQ prior to submitting the necessary paperwork.

Another significant objective of the Title V program is to shift the compliance liability from the regulating agency to the permitted source. Each year, the source must certify that it is in compliance with all permit terms and conditions, or indicate non-compliance issues. False reports have criminal implications beyond the civil liabilities of other violations. In addition, sources must report the results of monitoring at least every six months. Permit provisions for monitoring, record keeping, and reporting are added or enhanced to assure compliance with the permit conditions and limits.

An operating permit has a life of only five years (as opposed to the AO that does not expire. These permits, both initially and upon renewal, are complex and care must be taken to ensure that federal requirements for the Compliance Assurance Monitoring Rule (CAM) and any other new requirements (such as new MACT Standards) are included.

AIR QUALITY